In February 2018, two West Virginia University (WVU) students were struck by vehicles while crossing busy thoroughfares adjacent to the WVU campus in Morgantown, West Virginia. These crashes resulted in one student being killed and the other receiving serious injuries. In light of these crashes, the West Virginia Division of Highways (WVDOH), Federal Highway Administration (FHWA), City of Morgantown, Monongalia County, WVU, and the public have worked to improve pedestrian safety. A pedestrian safety task force was formed, which includes experts from a wide range of professional disciplines and representatives of the community and student body. The group’s focus is to develop a plan to enhance pedestrian safety locally, and throughout the state, through engineering, education, and enforcement.

While the state does not have an exceedingly high number of pedestrian fatalities, the urbanized areas and college towns have experienced pedestrian fatal and injury crashes annually. The pedestrian safety initiative directly aligns with West Virginia’s Strategic Highway Safety Plan (SHSP) and Highway Safety Plan (HSP), and both share a goal to reduce all fatalities and personal injury crashes statewide. The WVDOH uses a data-driven approach when looking at potential patterns and causes of pedestrian injuries and fatalities across the state, and the SHSP helps focus resources to reduce crashes. Roadway departures, impaired driving, no or improper safety equipment, speeding, and aggressive driving are all areas of concern.
As part of the pedestrian safety effort, the WV LTAP organized a Peer Exchange, held June 11-13, 2019 at the WVU Alumni Center in Morgantown, West Virginia. The Peer Exchange encompassed two events to provide more opportunities for participation: the Pedestrian Safety Symposium and the Pedestrian Safety Summit.

June 11, 2019 was the Pedestrian Safety Symposium. It was marketed to over one-hundred possible attendees including elected officials, public agencies, stakeholders, advocacy groups, and area experts in related fields. The Symposium was designed to be a series of presentations that allowed the audience to hear from multiple presenters on the status of pedestrian issues in the community, current efforts under way, and the tools and techniques available and used in other areas across the country.

June 12-13, 2019 was the Pedestrian Safety Summit. The Summit was marketed to a smaller list of potential attendees consisting of policy makers and area experts who can impact change locally. The agenda for the Summit included focused presentations and opportunities for discussion amongst participants and experts. The afternoon of June 12 consisted of a Road Safety Audit (RSA) exercise focused on pedestrian issues along the Patteson Drive Corridor. June 13 served as an opportunity to summarize the events that occurred during the Peer Exchange and focus efforts for moving forward.

The WV LTAP staff will continue to help promote transportation safety, not only for pedestrians, but also for motorists and roadway workers. Through training, outreach, technical assistance, and resource materials, the WV LTAP can continue to fulfill our mission of fostering a safe, efficient, and environmentally sound surface transportation system.

Craig Allred from FHWA discussed possible tools and approaches to improve pedestrian safety.

As part of the mini-road safety audit exercise, group members walked the Patteson Drive corridor from the WVU Alumni Center to the WVU Coliseum.

The Pedestrian Safety Summit included a discussion with local law enforcement regarding pedestrian safety challenges and successes.
Earlier this year, James “Marty” Stern, a WVDOH-D6 employee, became a WV LTAP Roads Scholar I Graduate! Congratulations on this achievement!

The Roads Scholar I program is designed for local and state level transportation personnel to expand their knowledge and improve their skills in roadway maintenance and management techniques. This is a great way for roadway agencies to keep their employees properly trained and educated. Most training is offered for no or minimal fees, and training sessions are offered at various locations throughout the state.

The Roads Scholar II program is designed primarily for local, state, and private transportation employees, who are in higher-level supervisory, management, and/or technical positions. Elected officials, engineers, planners, consultants, and contractors are a few of the individuals who will benefit from this program. Most training is offered for no or minimal fees and training sessions are offered at various locations throughout the state.

The WV LTAP website, wvltap.wvu.edu, lists our training calendar and the Roads Scholar I and II classes we offer, along with class descriptions, objectives, and target audience. If you would like to schedule or attend a Roads Scholar I or II class, or if you have additional questions regarding these Programs, please contact Ashley. acoll15@mail.wvu.edu or 304-293-9930.

According to the WV Tourism website, “the Mountain State has 17 covered bridges, dating back to the late 19th and early 20th century – each unique in its own respect.”

For me personally, covered bridges are one of those civil engineering wonders that I find intriguing and a little mysterious. They are an example of life lived at a slower pace — a beautiful and wonderful part of our history, worthy of being preserved.

I was very excited a couple of months ago when the WV LTAP received the publication, Guidelines for Rehabilitating Historic Covered Bridges. According to the National Park Service website, this book was developed as part of the Federal Highway Administration (FHWA)-sponsored National Historic Covered Bridge Preservation (NHCBP) Program. It is a wonderful resource for anyone involved with or interested in preserving and rehabilitating historic covered bridges from experts to individuals who just love covered bridges. The book cover many topics: general principles, superstructure features (timber truss and connections, bracing systems, and floor systems); substructure features (abutments and piers); exterior envelope (siding, portals, wall openings, and roof systems); site features (approaches and drainage, setting and landscape); and safety and protection features. Recommended and non-recommended treatments are outlined. The book also includes case studies for eleven different rehabilitated covered bridges from various states.

This resource is available online as a pdf at https://www.nps.gov/hdp/CoveredBridgeGuidelines2019.pdf. According to the website, limited printed copies of the book are available and may be requested by contacting Christopher H. Marston at christopher_marston@nps.gov.
We all live in a watershed. For highway departments, ditches are an integral component of the watershed that are also critical for the highway. Proper maintenance is important for the road and the environment.

The Value of Ditches

Ditches carry collected surface water to natural streams. They also collect some subsurface water from the base of the roadway or surrounding land. If maintained properly, they keep water away from the roadbed, which helps the road last longer.

Roadside ditches are also used by surrounding landowners to carry the flow of water away from fields. If done properly, this can work fine, but it needs to be done carefully in coordination with both the landowner or farmer and the local highway department. If done improperly, pollutants and sediment from the field can get into, and clog up, the ditch.

If a ditch is too deep, it can become a safety hazard. Ditches only need to be deep enough to carry the surface flows, and possibly drain the base of the roadway. Most ditches are already as deep as they need to be and making them deeper does not help. If there is a driveway along the highway, the size of the culvert under the driveway controls the capacity of the ditch to carry flow in most cases.

Intercepting Natural Flow

Just as ditches help keep a roadbed dry, they can also intercept natural drainage flow. Ditches not only drain the road surfaces, but they also efficiently capture runoff from adjacent hill slopes.

Research has shown that ditches can increase the runoff in natural streams by as much as 300 percent, which can lead to flooding. In fact, over 20 percent of the natural flow in the watershed may be diverted by the ditch system! This increased flow can lead to increased erosion and flooding downstream that is especially problematic when the ditch is over-scraped and not properly seeded or protected from erosion.

Ditches can also help carry pollutants and sediments downstream. There is some evidence that increases in pollution from ditches may be increasing the number of hazardous algae blooms (HABs). If ditches intercept natural flows, the effect can be to lower groundwater tables, induce drier streams, empty wells, increase stream bank erosion, and add more pollution to our drinking water supplies.

Ditch Maintenance Practices Across NY Research

A significant portion of the work undertaken by most highway departments is ditch management. A few years back, Cornell University Professor Rebecca Schneider, and her graduate student Anthony Johnson, surveyed all of the town and county highway officials across New York State about their ditch management practices. They received a very high response rate (41%) from the 999 highway staff surveyed.

A third of the agencies reported using full scraping or reshaping without any reseeding as their primary method of ditch management and half the agencies scraped their ditches on average once every one to four years. Based on these numbers, one-third to one-half of the roadside ditches across upstate New York are more prone to erosion and increased flow beyond what would be expected if seeding and best management practices were followed in every case.

This translates to thousands of miles of exposed substrate that is more vulnerable to storms and acts as a source of sediment and pollution. Limited resources including time, labor, equipment, and money were the primary reasons given for the less than ideal management practices used. Additional challenges identified included interactions with landowners over rights-of-way (ROW), farm-field drainage, and increasing frequency of downpours.

The study also identified barriers to the implementation of recommended best practices to improve ditch management. A
majority of those who were surveyed reported conducting ditch maintenance:
A) When convenient,
B) With scheduling, most commonly based upon existing maintenance plans,
C) Prior to roadwork and resurfacing projects, and,
D) In response to constituent complaints.

Ditch management is not just about what happens within the ditch, but also about where the ditch discharges. While 35 percent reported that most of their ditches discharged straight into streams, the majority (65%) of respondents stated that less than one quarter of their ditches did so. Over two-thirds (67.8%) of the respondents stated that they were concerned about reducing sedimentation and water pollution and would consider redirecting existing ditch water outflow away from surface water sources and into infiltration basins or other sources. Of those who would not consider redirecting ditch water outflow away from surface water sources, the perceived costs, time, equipment and space needed to make such changes were the primary reasons.

Respondents also noted an increase in the use of roadside ditches for farm field drainage, including increasing drain tile flow and sedimentation from exposed farm fields. Several agencies mentioned that weather, and specifically the increase in severe rains, is a growing problem.

BMPs for Ditches
There are many Best Management Practices (BMPs) for ditch management. These practices can generally be categorized as addressing separate, but overlapping goals, i.e. draining the road, decreasing flooding and reducing water pollution. There are plenty of times when a ditch needs to be reshaped or rebuilt to slow down the flow of water. In some cases, it may be important to redirect the ditch so it does not discharge directly into streams or lakes. See the resources at the end of this article for some ideas.

In most cases, however, the most critical activity to improve the performance of a ditch is proper maintenance. Here are some of the more critical items to keep in mind as you perform basic ditch maintenance:

**Keep Ditches Shallow.**
Ditches, for the most part, do not need to be that deep. Even a few inches into the subgrade is usually enough to drain the road base. If there is a driveway in the ditch, the capacity is controlled by the driveway pipe and making the ditch deeper or wider is likely to lead to more erosion, not more capacity to carry flow.

**Clean, Don’t Scrape.**
Remove as little material as needed to reestablish the flow line of the ditch. Do NOT scrape the fore and back slopes. If possible, survey the work ahead of time or use a laser level to set the grade. Work uphill so the ditch is not over scraped. Going downhill also leads to flat spots that hold water and can actually encourage mosquitoes.

**Always Reseed.**
The last step is not the last truck-load of removed material, it is reseeding the ditch, with a hydro-seeder, or even seeding by hand can be very effective if done as part of the initial cleaning operation. Waiting a couple of weeks will be too late, so seed immediately!

If the ditch is too steep, rock or check dams may be warranted, but too much rock can lead to overheating of the water and can be difficult to maintain long-term. If using rock, erosion blankets, or any other erosion protection method, be sure these methods are ready to go as part of the initial ditching work.

**Mow if Possible Instead.**
In many cases, just mowing the ditch is enough to get the flow reestablished. Look for alternatives when you cannot mow often enough to keep the ditch flowing. **Try to make mowing your primary ditch maintenance tool.**

**When in doubt, GET HELP.**
There are lots of available resources to help guide you, from Soil and Water Conservation Districts to the DEP to the WV LTAP, and many more. Following ditch maintenance best management practices benefits us all.

**RESOURCES**
Stormwater Management, Cornell Local Roads Program, CLRP No. 14-03
https://cornell.app.box.com/v/clrp-ws-sm

Roadway and Roadside Drainage, Cornell Local Roads Program, CLRP No. 98-5
https://cornell.app.box.com/v/clrp-ws-rrd

Roadside Ditches: Best Management Practices to Reduce Floods, Droughts, and Water Pollution
https://cornell.app.box.com/v/clrp-tt-ditches

Understanding Ditch Maintenance Decisions of Local Highway Agencies for Improved Water Resources across New York State
Rebecca Schneider, PhD, David Orr, P.E., Ph.D., Anthony Johnson
https://cornell.box.com/s/d2x2kcd9ycqnprpo6afjovc57hf5dhye
WORKING ALONG THE ROADWAY
TAILGATE SAFETY BRIEFING

a National LTAP Association Resource

- First and foremost - BE VISIBLE. Wear bright, high-visibility clothing that meets the standards of the American National Standards Institute (ANSI).
- Look for hazards. Always survey the work area for potential hazards. Besides the traffic, what’s out there?
- Plan multiple escape routes. Where will you run if a vehicle drives into the work area?
- Use the buddy system. Everybody watches out for everybody else.
- Frequently glance at oncoming traffic.
- Make eye contact with equipment operators. Be sure you always have eye contact with an operator before approaching equipment. Let the operator know where you’re going and what you’re doing.
- Never approach equipment from the operator’s blind spot. Stay out of the danger zone - the area directly behind the equipment.
- Don’t hitch rides on equipment, especially just by hopping on the side of moving equipment and grabbing hold of something. It’s just as easy to fall off and get run over.
- Where’s the traffic? Know where you are in relation to the traffic at all times. Don’t work with your back to oncoming traffic. Don’t bend or stoop toward the traffic lane if working next to live traffic.
- Watch out for large side mirrors on passing vehicles. When stopping on a project or along the highway, check your mirrors and make sure you are clear before opening a door and stepping out.
- Stay out of “crush zones.” Don’t put yourself near a fixed stationary object or between two pieces of equipment where you can be crushed when something moves.
- Always stay on the working side of the barrier wall and not on the live traffic side. That’s why we call it the working side. Don’t cross bi-directional traffic or permanent barrier walls on freeways or interstates.
- Buckle up before starting up and running your equipment. Turn on the strobes if available.
- Look in all directions. Remember that it’s difficult to see other vehicles that might blend in with their surroundings. You can miss seeing them with a quick glance. Take several seconds to look in each direction.
- Always be alert for emergency equipment and school buses - give them the right of way.
- Check out your traffic control once it’s set up. Drive through the advance warning area and work area to make sure all signs and traffic control devices are visible and drivers are not being misled.
- Plan your equipment route through the work zone to minimize the number of turn-arounds and backing up of trucks.
- Watch where you park. Stay out of equipment operator’s blind spots or swing radius.
- Know what alerting procedures and communications are being used in the work zone.

Users of this tailgate talk are advised to determine the suitability of the information as it applies to local situations and work practices and its conformance with applicable laws and regulations.
People are often surprised to learn that West Virginia, while being a relatively small state, has the sixth largest state-maintained highway system in the United States. Out of 38,770 miles of roadway, the WV Department of Transportation/Division of Highways owns and maintains 34,691 miles!¹

West Virginia is one of five states that do not have county owned highways. The other states are Virginia, North Carolina, Delaware, and Connecticut. In the case of Connecticut, the county level of government does not exist at all.

**MUNICIPAL BREAKDOWN**

West Virginia has 55 counties with 230 incorporated municipalities, owning and maintaining 3,244 miles of road. Incorporated municipalities fall under a class system, from 1 to 4, based on their populations.

**Class 1 (greater than 50,000)** – The City of Charleston is West Virginia’s sole Class 1 city. It is likely after the next census there will be zero Class 1 cities in West Virginia.

**Class 2 (10,000 to 50,000)** – West Virginia has thirteen incorporated municipalities in this category, with an average population of 21,103.

**Class 3 (2,000 to 10,000)** – West Virginia has forty-six municipalities in this category, with the average population of 4,045.

**Class 4 (Less than 2,000)** – This is the category that the overwhelming majority of West Virginia’s incorporated cities fall under. In fact, 170 municipalities (74%) are in this category, with an average population of 762.²

So, how is this data helpful to the WV LTAP and the services we provide?

- We know that the majority of cities in West Virginia have less than 2,000 residents, and their average budget for streets and transportation is $27,000. This means these cities are working with very limited funds, and the no-cost and low-cost training, technical assistance, and resources we offer can help stretch budget dollars.

- We know that the WVDOT/DOH is responsible for over 90% of the roads in West Virginia, and in many instances, serving the role of what local/county roadway agencies do in the majority of states across the US.

- We know from other data that over 65% of the fatal crashes in the state occur on state-owned rural roads, with roadway departure being the number one cause for a traffic fatality (over 70%). The WV LTAP will continue to focus on rural roadway safety and providing training on this topic.

The WV LTAP is dedicated to providing training, technical assistance, and resources to those agencies in our state that design, construct, and maintain our roadways, streets, bridges, sidewalks, and trails. Please contact the WV LTAP if you are interested in training, or if we can be of assistance to your agency.

**Sources:**

1. WVDOT/DOT Webpage: https://transportation.wv.gov/highways/Pages/default.aspx
2. WVSAO Webpage: https://www.wvsao.gov/localgovernment/Default#MunicipalBudgets

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¹ West Virginia Department of Transportation/Division of Highways
² West Virginia State Auditor's Office Webpage: https://www.wvsao.gov/localgovernment/Default#MunicipalBudgets
The West Virginia LTAP is part of the National Local Technical Assistance Program, which is funded by the Federal Highway Administration (FHWA). The West Virginia LTAP also receives funding from the West Virginia Department of Transportation (WVDOT).

Country Roads & City Streets is published three to four times per year. The purpose of this newsletter is to provide information that is beneficial to decision makers, elected officials, and roadway construction, maintenance, and management personnel.

The material and opinions included in this newsletter are those of the West Virginia LTAP and do not necessarily reflect the views of FHWA or the WVDOT. Every effort has been made to ensure the integrity and accuracy of both original and borrowed material. However, the West Virginia LTAP does not assume responsibility for any information that is found to be incorrect.

THE MISSION

The mission of the West Virginia LTAP is to foster a safe, efficient, and environmentally sound surface transportation system by improving skills and increasing knowledge of the transportation workforce and decision makers.

To help achieve this mission, training, demonstrations, technical assistance, and resource materials are provided.

Transportation Asset and Infrastructure Management (TAIM) Conference

October 28-29, 2019

The Penn Statler Hotel and Conference Center-Penn State, State College, PA

For More Information:
https://www.taim.psu.edu/agenda/Session-Information.aspx

Mark Your Calendar for the 2019 Roadway Management Conference!

October 21-23, 2019
Turf Valley Resort
Ellicott City, MD

RMC

Attendee Registration Fee
$150 until August 30, 2019
$175 after August 30, 2019

https://roadwaymanagementc.wixsite.com/home