LTAP
The Pennsylvania Local Roads Program

Moving Forward

Vol. 20, No. 2 | *A quarterly review of news and information about Pennsylvania local roads* | Summer 2002

PENNSTATE 1855

PENNDOT

DEPARTMENT OF TRANSPORTATION UNITED STATES OF AMERICA

Center For Local Government Services

In This Issue

Routing Slip

Don't file this quarterly newsletter too quickly.

Please read it, photocopy what you want, initial below, and send it on—especially to the frontline troops.

☐ _____

☐ _____

☐ _____

☐ _____

☐ _____

_____

The Pavement Management Process

Alan Kercher, Engineer
Delaware Technology Transfer Center

Many municipalities have limited resources and cannot allocate a significant portion to implementing a complex pavement management system. This article will outline a simplified approach for those who still recognize the need to systematically document pavement maintenance needs. For this article, it will be assumed that municipalities are using a pavement management software program (PMSP).

Note: LTAP offers a PMSP free to Pennsylvania municipalities. Call 1-800-FOR-LTAP for your copy of Roadway Surface Management System (RSMS) software.

The basic steps to a pavement management system are a road inventory survey, a surface condition survey, repair strategies, needs of the roadway network, and a budget. Each is discussed below.

Road Inventory Survey

This is collection of the information needed to describe the roadways in the local network (all municipal roads and streets). The information may include:

- Section description (a section is a length of roadway that has uniform features such as width, pavement type, etc.).
- Functional classification.
- Pavement type.
- Length and width.
- Construction history.
- Traffic.

The amount and type of information gathered can be adjusted to fit municipal needs. A good rule of thumb in starting an inventory is: Don't get carried away! The objective is to gather what you need without gathering too much.

Since the inventory is the most time-consuming step, it will benefit from a phased approach. Determine the types of information needed (as above), the information that already exists in office records, and the information that must be gathered by a survey team.

Data gathered in the field can be recorded onto forms developed for the survey or entered directly into the PMSP using a laptop computer. Some people prefer a laptop computer, others find it cumbersome and confusing. Making sure that the information is accurately recorded is more important than how it is recorded.

Surface Condition Survey

The purpose of this crucial survey is to determine the condition of each roadway section by observing any distresses. Certain distresses are very much related to particular causes of pavement deterioration, and a PMSP will link distress types to repair strategies that

continued on page 2

The Pavement Management Process
continued from page 1

account for these causes. Therefore, an accurate surface condition survey ensures that the proper repair strategy is selected for each roadway section. Inaccurate data lead to inappropriate repair strategies that ultimately result in the inefficient use of funding.

Personnel performing the surface condition survey must be trained to produce correct, consistent appraisals. The survey is a visual inspection of 100 percent of the municipal roadway network. It is conducted in a vehicle traveling at approximately 5 to 15 miles per hour.

The following distresses should be included in the surface condition survey of the average municipality with asphalt pavements:

- Alligator cracking.
- Longitudinal and transverse cracking.
- Edge cracking.
- Potholes and patches.
- Roughness.
- Rutting.
- Raveling and oxidation.

In addition to the types of distresses, the severity and extent must also be recorded. Severity refers to the degree of pavement deterioration (low, medium, high) represented by a distress. Extent refers to the frequency of occurrence or amount (percentage) of road surface affected by a distress. The severity and extent of a distress will directly determine which repair strategy is required. For example, if a roadway section has alligator cracking with high severity but limited extent, only routine maintenance, such as a patch, may be required. However, if the alligator cracking exhibits high severity and great extent, reconstruction of the section may be required.

Repair Strategies

This step requires a municipality to decide on repair alternatives it will consider. Some municipalities will want only to patch, overlay, or reconstruct. Others may consider other options as well, such as micro-surfacing and cold, in-place recycling. Once selected, the initial set of repair alternatives is not "set in stone." Alternatives may be added. A municipality with only a few alternatives probably will determine that it should consider other options that may be more cost-effective in certain situations.

Once *repair alternatives* are established, each must be grouped into major categories referred to as *repair strategies*. This is because a PMSP's decision-trees first link the type, severity, and extent of distresses from the road condition survey with an appropriate repair strategy for a roadway section. Then the PMSP determines which of the municipality's repair alternatives should be used on the section.

There are five generally accepted repair strategies:

- **Routine maintenance** usually includes repair alternatives such as local patching, crack sealing, and other low cost actions. Localized distresses, such as severe bumps and potholes, are usually corrected first. All routine maintenance should be funded each year, if possible.
- **Preventive maintenance** includes repair alternatives such as surface treatments designed to stop deterioration before it becomes a serious problem.
- **Deferred action** covers roadway sections that will receive minimum funds in the current budget because they are beyond the point where preventive maintenance will be effective but have not yet deteriorated to the point of needing rehabilitation. When a municipality defers action, it must be prepared to fund rehabilitation or reconstruction when it becomes necessary.
- **Rehabilitation** includes repair alternatives such as overlays and recycling. Funding for completion of these major projects may depend upon long-range planning and careful scheduling of improvements in stages.
- **Reconstruction** includes repair alternatives such as complete removal and replacement of a failed pavement. It may also involve features such as widening, improved alignment, grade changes, guide rail, and drainage work. Lead times of several years may be required because of the more costly nature of reconstruction and the time required to develop a complete plan of action, secure permits, and establish special funding.

Needs of the Roadway Network

In this step, a PMSP will analyze all the entered data and determine the most cost-effective repair alternative for each roadway section in the municipality's network. The reports that the PMSP generates also will include estimated cost to repair each section and total cost to repair all roadways in the network.

The reports simply list each roadway in alphabetical order. In other words, this analysis does not consider priorities. Most municipalities do not have the funds to repair all roadways in one year. Therefore, additional analyses must be performed to prioritize the needs of the network. Based on a prioritization scheme within the PMSP, reports will be generated that list the roadways in the order that they should be repaired.

Prioritization uses either the worst-first method or the best-first method. The worst-first method will select the sections in the worst condition to be repaired first. The best-first method will select those in good condition first.

Note: the best-first method may be more cost-effective in that it selects roadways on which less expensive repair alternatives, such as crack sealing, will extend roadway lives before the roadways can deteriorate to the point where they require more expensive repair alternatives.

Budget

At this point, a municipality must make the tough decision of how much funding should be allocated to repairing its roadways. Remember that the total cost of repairs for a network is not stagnant. As time goes on, roadways that need repair will continue to deteriorate and perhaps require more extensive

continued on page 3

repair. If the maintenance and rehabilitation budget is under-funded, the total cost of repairs for all roadways can soon rise dramatically. Therefore, it is important to develop not only a short-term budget, but a long-term plan as well.

Once the roadways to be repaired have been selected, they must be examined more closely to determine the scope of work. The closer look is necessary because the surface condition survey does not measure exact quantities of repairs. After this closer look at the selected roadways, a more detailed cost estimate for their repair can be developed.■

Note: This article was reprinted with permission of the Technology Transfer Center operated by the Delaware Department of Transportation, Delaware's LTAP center.

Assistance with Pavement Management

For further information about establishing a pavement management system, technical assistance, or a free copy of Roadway Surface Management System (RSMS) software, call Pennsylvania's LTAP center at 1-800-FOR-LTAP.

LTAP's Roads Scholar Program 2 course, Roadway Surface Management, includes instruction in appraisal of surface conditions and use of RSMS software. Offered each year at convenient locations across the state, the free, one-day course can also be brought directly to your municipality as a roadshow upon request.■

PENNDOT Truck and Equipment Auctions

Two auctions remain this year in the PENNDOT-Department of General Services (DGS) program to sell surplus trucks and other roadway maintenance and construction equipment:

- **Aug. 10, McConnellsburg, Fulton County**
- **Nov. 9, Buckhorn, Columbia County**

Descriptions of trucks and equipment to be auctioned are posted on PENNDOT's Web site, www.dot.state.pa.us (Special Interest Areas, Auctions), approximately one month prior to the auction date. In addition to heavy trucks and off-road equipment, some light-duty vehicles such as vans and pickups are included. Auction details and directions to the auction site are available on the Web site or by calling Tom Douville at (717) 215-3154. Prices paid for items at previous auctions are posted as well.

Items to be auctioned can be viewed 8 a.m. to 2 p.m. the day before the auction and 7 to 9 a.m. the morning of. Motorized equipment is started on the morning of the auction. Test drives are not allowed. A few items that are too old to move are parked at PENNDOT locations remote to the auction site. They are auctioned on the basis of their photos.

On-line bidding on selected trucks and equipment has been added this year via a link to Scherrer Auctions on the PENNDOT Web site. Bids can be submitted electronically before and during the auction. The selected items are pictured and described on the PENNDOT Web site. Arrangements to view and start these items in advance of the auction can be made by calling Tom Douville. Photos of a few items not subject to on-line bids are also shown on the Web site as examples of what will be available auction day.

A notary will be on hand auction day to process titles and issue plates. Payment can be with cash, business or personal check (with identification), or credit card (with a service charge). Buyers pay a 2.5-percent premium on purchases at the auction site and a 5-percent premium for on-line purchases. Those who want to finance purchases must make arrangements with Scherrer Auctions (1-800-536-1401) prior to the auction.

Remember that much of the equipment, including graders, rollers, loaders, and pavers, but not trucks, is available exclusively to municipalities prior to auction, via sealed bid through the *Pennsylvania Bulletin.* Arrangements can be made to view and start equipment at its location prior to submitting a sealed bid. At auctions, municipalities will be competing against dealers, organizations, and the public as well.

The PENNDOT Web site contains a link to the DGS Web site, which has information on other state and federal surplus programs administered by DGS, such as DGS auctions of light-duty vehicles. An article in the winter/spring 2000 issue of *Moving Forward* (Vol. 17, No. 4) provides an overview of these programs. The issue can be downloaded in .pdf form from LTAP's Web site at www.ltap.psu.edu.■

APWA Offers Click, Listen, & Learn

The American Public Works Association's Click, Listen, & Learn program offers municipalities the knowledge of nationally recognized experts on public works issues live from conference sites via the Internet.

Without leaving home, municipal participants can ask questions and receive answers on the spot. All you need are a computer with Internet access and a telephone. The visual portion of the conference is presented over the Web, while you hear the audio part over the phone.

The next Click, Listen, & Learn conference is *Effective Use of Chemicals and Abrasives for Winter Road Maintenance,* Tuesday, Oct. 29, 11:00 a.m. to 1:00 p.m. The conference will present the basics on use of chemicals and abrasives for snow and ice control, review new chemicals, and discuss how pre-wetting and anti-icing can improve safety of local as well as state roads.

In December, the program will present *Risk Management and Tort Liability on the Roadways: What You Need to Know to Protect Your Agency!*

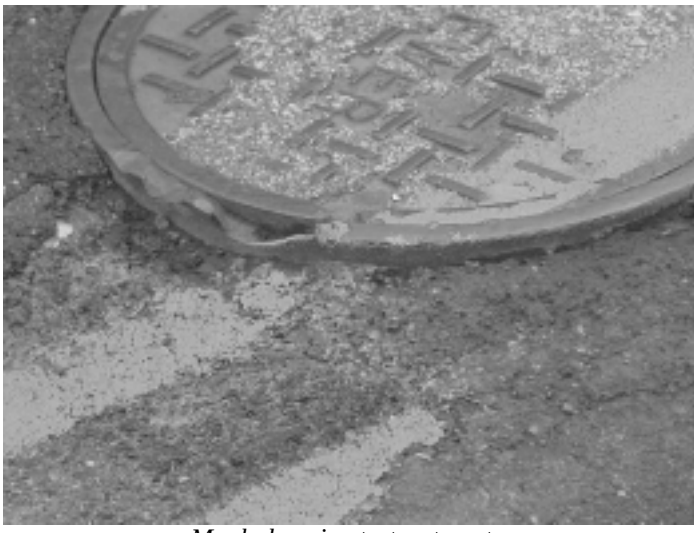
continued on page 6

Manholes and Snowplows

Thomas L. Hayman
Swatara Township (Harrisburg area) Highway Superintendent

Note: This article originally appeared in the April 2002 issue of Public Works Magazine. *Reprinted by permission. Copyright 2002 Public Works Journal Corporation, 200 S. Broad Street, Ridgewood, NJ 07450.*

Over the years, Swatara Township has treated sanitary sewer covers in several ways to reduce or eliminate damage to its plows during snow removal operations. We have tried cold patch, ID2 hot mix, and ¼-inch curbing mix with limited, short-term success on spot repairs. Initial treatment always required follow-up and additional maintenance, and always failed.



Manhole prior to treatment: not only snowplows suffered damage.

Formerly, where streets were repaved, manholes were raised and leveled after paving. Today, manholes are raised first and then paved level with overlay. This method has resolved our issues on streets that are repaved, but most of the township's manholes are on roads that are otherwise in satisfactory condition. We continued to look for the road treatment that would work long term.

About three years ago, Crafco, Inc., demonstrated its PolyPatch material for us as a treatment for alligatored roads. The company patched a 3 ½-foot-by-4-foot section that we normally would have excavated, then repaired with rolled, hot-mix asphalt. That patch is still sound today after three winters of anti-skid treatment, salt, and plowing.

The Idea

The plowing had only minimally impacted the edges of the material. It dawned on us that this might be the solution to eliminating elevated-manhole damage to our snowplows. Material-wise, we were talking about $20 per manhole using equipment and a process that our crew could easily learn and accomplish in-house, eliminating outside labor costs.

I contacted Doug Gensler, the Crafco sales representative in central Pennsylvania, and ran the idea past him.

Spreading material around a manhole with a rectangular trough lute.

He was more than willing to give it a try and was instrumental in placing the demo "rings" as well as training our crew. The demo quickly convinced me that this was the answer to our elevated-manhole problems. Since then, we have treated 20 to 30 manhole covers a day, weather permitting. From mid-December to mid-February, our crew treated over 180 manhole covers with only five partial failures from plowing operations that had to be repaired again. A failure rate of less than 3 percent: I can live with that!

The Treatment

The process is straightforward. The crew blows clean with an air compressor the manhole cover area to be treated, then heats and dries it with a torch attached to a PolyPatch patching machine. Melted material is bucketed into a rectangular trough lute and spread around the cover. Edges are torch-heated to seal to the pavement and *voila!*: one less plow problem.

Last year, manhole damage to plows exceeded $9,000. This year, there were no reportable repair costs from plow areas

continued on page 5

Sign Quiz

Joe Kisic, LTAP Technology Transfer Specialist

Given the responsibility to inspect signs and repair as needed, you come across this bus stop sign. What should you do? (Check off all the actions you should take.)

A. Paint the bucket before it rusts.

B. Replace the bucket with a concrete-filled plastic bucket for safety reasons and less maintenance.

C. Use a taller post.

D. Make the post installation "breakaway" at the top of the concrete in the bucket.

E. Ignore it because the sign is the transit authority's responsibility.

F. Install the signpost into the ground according to PENNDOT standards for municipalities.

G. Contact the transit authority, and require that the sign be installed according to your standards.

Answer(s) on page 6

Manholes and Snowplows

continued from page 4

Torching the edge of a finished patch to seal it to the pavement.

where the patching has been completed. The greatest testament that I can give comes from my men. The drivers whose areas are completed cannot believe they are not hitting manholes any longer, and those whose areas are not finished are willing to go out in 30-degree, windy weather to apply the material to protect themselves and their equipment.

Note: In a conversation with the editor, Tom Hayman said that the township is using the material again this year in its manhole program. It's a polymer-modified asphalt binder containing selected aggregate. Other manufacturers have similar products. He also said he is considering purchase of a PolyPatch machine, since he also plans to use the material for patching in preparation for overlays.

For the manhole program, he leased the PolyPatch machine at $1,500 per week. The PolyPatch material, which is priced by the pound, comes in cardboard-packaged blocks that are melted in the machine's kettle and applied around the manholes directly out of the machine or from hand-manipulated buckets.

Sign Quiz Answer

from Sign Quiz on page 5

And the Sign Quiz answer is…

Either F or G: "Install the signpost into the ground according to PENNDOT standards for municipalities" (if the sign belongs to the municipality) or "Contact the transit authority, and require that the sign be installed according to your standards" (if the sign belongs to that agency).

It may be common to think that if a sign isn't yours, "Don't worry about it," and move on to the next sign for inspection, but we need to look at the bigger picture.

In general, municipalities pass ordinances to help control and regulate installations within the right of way of their roads and streets. It is obvious that the sign in the photo is within the right of way. Furthermore, The Vehicle Code, Title 75 of the *Pennsylvania Consolidated Statutes,* Section 6122, gives authority to local authorities to erect official traffic control devices (which include signs) on any highway within their boundaries. It also says these devices shall be installed and maintained in conformance with the manual and regulations published by PENNDOT.

Your consideration of the bigger picture also suggests a look at tort and liability issues. Given your local ordinances governing the right of way, as well as the provisions of Title 75, your municipality has an inherent responsibility to make sure signs are placed and installed according to PENNDOT regulations and guidelines. Your failing to do so therefore would open the municipality to tort liability claims if a non-standard sign were a factor in a crash. The regulations and guidelines were formulated to ensure safe and positive guidance to motorists, help prevent crashes, and reduce municipal exposure to tort liability claims.

Okay, so some of you are thinking, "But this is not a sign that applies to the safe and efficient movement of vehicles; it's to mark a bus stop where riders get on and off, so what's the big deal?" Well, it is a big deal. The sign in the photo is installed within the right of way of a municipal roadway. You have authority over installations in the right of way. If the installations are traffic signs, they must be in conformance with PENNDOT guidelines and regulations. What if a driver were to lose control of the vehicle and it struck this bus stop sign placed in a concrete bucket? The likelihood of the crash being more severe would be higher than if the signpost were installed into the ground in breakaway fashion, with the sign at the proper height, according to PENNDOT regulations and guidelines. As examples, the sign/bucket could flip up into the windshield of the vehicle, or it could be tossed into another vehicle or a pedestrian at the bus stop. Because of the severity, the parties involved in such crashes would be inclined to put some or all of the blame onto the municipality for installing this sign, or allowing it to be installed, improperly. As a side note, such movable sign supports are more likely to figure into acts of vandalism than properly installed supports.

When installing traffic control devices (including signs) or other appurtenances within your rights of way, or permitting them to be installed by others, it is important to follow the standards required by PENNDOT for proper installation. This information can be found in a publication produced by PENNDOT called *Sign and Pavement Marking Handbook for Local Municipalities.* This handbook shows local authorities the where, how high, type of post, etc. for the proper installation of signs.

For information and assistance on proper installation of traffic control devices, call LTAP at 1-800-FOR-LTAP. The Sign and Pavement Marking Handbook *is available free from LTAP, which also offers a free, half-day Roads Scholar course on Traffic Signs annually at convenient locations across Pennsylvania. You can also request that the course be brought to your municipality as a roadshow.*■

Click, Listen, & Learn

continued from page 3

This conference will identify common liability issues faced by street departments and highway agencies in areas such as traffic control devices, roadway surface conditions, shoulders, and work zones. Presenters will also point out risk management strategies to reduce and prevent accidents and tort liability suits.

Registration for these sessions is $150. To participate, log on to http://www.apwa.net/education/CLL/ and follow the instructions for registration.

Previous Click, Listen & Learn conferences have included:

· *Storm Water NPDES Phase II: Setting Measurable Goals for Your BMPs.*

· *Implementing GASB 34 – What It Could Mean for You.*

· *Using Gut-level Emotion to Make Safety Training Stick: An Alternative Approach That You Can Use.*

· *Cutting through the Dust: Dirt and Gravel Road Maintenance.*

· *Countering Disaster before It Strikes.*

Previous conferences may be purchased in CD-ROM from the APWA Web site.■

LTAP Revamps Its Website

Albert F. Davenport, LTAP Research Assistant

Pennsylvania LTAP has updated its Web site. The site, located at http://www.ltap.psu.edu, lists current training information, has a searchable transportation library, and provides an easy-to-use interface for contacting LTAP engineers and technology transfer specialists.

The new LTAP Web site.

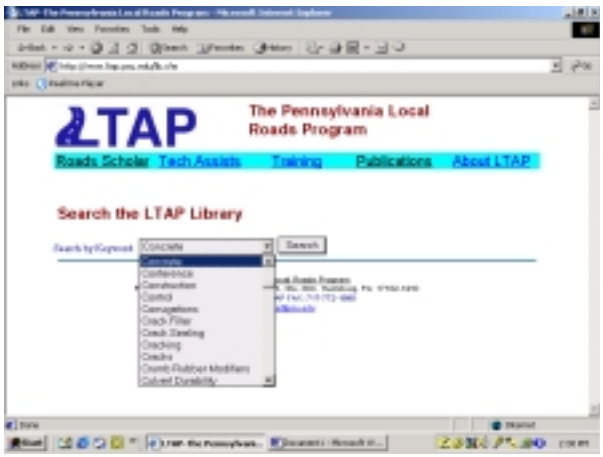
The Web site provides detailed information about LTAP's free Roads Scholar courses. By logging on and clicking on the Roads Scholar link, users can get a course description, browse the schedule of upcoming Roads Scholar courses, and choose a location and date to attend.

Once a person identifies a suitable session, it is simply a matter of filling out the on-line form to register. Registrants receive e-mail confirmation of their registrations usually within two business days.

Of course, LTAP's training extends far beyond annually scheduled Roads Scholar courses. Follow the Training link to find upcoming training sessions (roadshows) and special events to be presented by LTAP engineers and technology transfer specialists at the request of municipalities. The Training schedule provides contact information within each hosting municipality. If a roadshow or event is coming to a nearby municipality, your participation may be just a phone call away. Simply contact the hosting municipality to find out about openings.

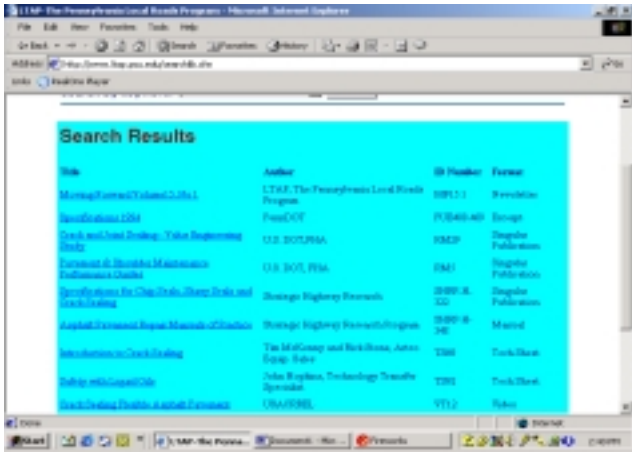
Have a difficult technical question? Click on the Tech Assists link and e-mail LTAP your question. Your request will be passed directly to the appropriate LTAP engineer or technology transfer specialist.

If you choose to research the problem yourself, follow the Publications link to search the LTAP library as well as past issues of *Moving Forward* and tech sheets. Some materials, such as recent newsletters and tech sheets, are available in Adobe portable document format (.pdf). Pdf files can be downloaded directly from the Web site.



Library search page.

Library materials, such as videos, manuals, and other media, are searchable by key word through the Web site. Simply find your key word in the pull-down menu and click "search." All related library materials will appear.



Search results page.

For more detailed information on any one item, simply click on the hyperlinked title. If you decide to request the item, simply click on the LTAP e-mail link at the bottom of the page. Be sure to include the Library ID Number in your request.

LTAP hopes its new Web site will serve as a valuable source of information for municipalities throughout the Commonwealth. Further enhancements are planned in the coming months. Check out the site from time to time, and feel free to contact us through the e-mail link on the page. We at LTAP are always happy to hear from you.■

Useful Publications

The following recent publications may prove useful to municipalities:

Gravel Roads Maintenance and Design Manual

Put together by South Dakota LTAP under the sponsorship of the Federal Highway Administration (FHWA), this is a comprehensive manual on gravel road maintenance that also provides some basic design elements. It includes many illustrations and color photos specific to problems and practices in gravel road maintenance. Two engineers associated with Pennsylvania LTAP, Alan Gesford and John Hopkins, served on the technical review committee.

The original printing has been distributed, but a second printing is in the works. When it's ready, the FHWA report center at (301) 577-0818 plans to distribute it **free.**

Some copies of the original printing are still available from the National Technical Information Service by sending a check or money order for $33 plus $5 shipping and handling to NTIS, Springfield, VA 22161. Specify the report number as PB2002101136. You may also call NTIS at 1-800-553-6847 and order with a credit card.

Guidelines for Geometric Design of Very Low Volume Local Roads

Available from the American Association of State Highway and Transportation Officials (AASHTO), this new publication incorporates an approach to geometric design of these roads that stems from research on the safety and cost-effectiveness of geometric elements. Obtain with a credit card for **$30 (members), $35 (non-members),** at 1-800-231-3475 (phone), 1-800-525-5562 (fax), or www.transportation.org (on line), or with a check payable to AASHTO, P.O. Box 96716, Washington, DC 20090-6716 (include shipping instructions).

Roundabouts: An Informational Guide

Published by FHWA in June 2000, this report (FHWA-RD-00-67) provides guidelines of national scope for this intersection control measure that is seeing increasing use in the U.S. for its capacity and safety benefits and in some traffic calming programs. The guidelines cover policy, planning, operations, safety, geometric design, traffic design, and system considerations. Penn State conducted some of the research that supports the guidelines.

The guidelines can be viewed on line and downloaded from the FHWA Turner-Fairbank Highway Research Center's Web site at www.tfhrc.gov in the library section. A limited number of hard copies are available **free.** Fax a request to (301) 577-1421 that includes the report name and number, your phone number, and delivery instructions.■

LTAP
Moving Forward
Gregory Dauber
Editor
Penn State Eastgate Ctr.
1010 N. 7th St., Ste. 304
Harrisburg, PA 17102-1410
Phone: 800-FOR-LTAP
Fax: (717) 772-1998
Email: LTAP@psu.edu