Vol. 1, No 1

COUNTRY & ROADS CITY STREETS

West Virginia University

West Virginia Municipal Street and Highway Information Program
Harley O. Staggers National Transportation Center

Municipal Street and Highway Information Program Initiated in West Virginia

Have you a need for greater knowledge about some aspect of municipal streets? West Virginia University has established a Municipal Street and Highway Information Program to provide technology transfer services to communities in West Virginia. Funded by HPR monies from the West Virginia Department of Highways, the program is operated by the Harley O. Staggers National Transportation Center at West Virginia University. Activities of the program will include:

- o Publication of a semiannual newsletter (this is the first issue)
- o Conducting seminars on street and highway management and technology at locations throughout the state
- o Disseminating information on reports, films, filmstrips, and other publications available from Federal, state or other sources
- o Developing a network for the exchange of information and experience among communities

An Advisory Board is being established to provide guidance for program activities. Two sections will exist: one for the northern portion of the state and one for the southern portion. This will make it easier for Board members to travel to meetings and allow more communities to be represented on the Board. It will also make it possible for regional interests to be expressed. The northern section will meet in Morgantown and the southern section in Charleston or another convenient location.

The program is being directed by Ed Neumann, P.E., Ron Eck, P.E., and Paul DeVore. Ed Neumann is Director of the Harley O. Staggers National Transportation Center. He and Ron Eck are on the faculty of the Department of Civil Engineering. Paul DeVore is on the faculty of the Technology Education Program. They are being assisted by two graduate students, Patricia Wattick (Civil Engineering) and Jeff Michaels (Technology Education). The staff has been travelling around the state meeting with directors of public works and city engineers.

Advisory Board Members, Northern Section: top row, Paul DeVore, WVU; Ron Eck, WVU; Ed Neumann, WVU; Marvin Murphy, WVDOH; Tom Forrer, WVDOH; front row, Dave Reilly, FHWA; Lyle Moulton, WVU; Howard Ralls, Morgantown; Tom Arnold, Fairmont

This is your newsletter; a forum for those responsible for development and maintenance of municipal streets. Please write or call (293-4550) if you wish to ask a question, or can help to answer a question printed in the newletter, (note the question and answer column elsewhere in the newsletter). We'd also like to hear from you about any new item concerning management of streets in your community. We've established a column entitled <u>Around the State</u> which will report news briefs from communities, such as changes in personnel, street improvement programs, new techniques being attempted, and other activities. For major stories, we'd be happy to publish separate articles.

Workshop on Pavement Management for Municipal Streets this June 11—
See Page 11 for Details

Results of Statewide Survey on Municipal Street Programs in West Virginia

During January and February, the staff of the Municipal Street and Highway Information Program conducted a survey of West Virginia communities to determine the extent of their street and highway programs. Much useful information was obtained, which will enable us to better serve your needs. This survey may be the first conducted in West Virginia that establishes the level of municipal involvement in streets and highways. It indicates that the Municipal Street and Highway Information Program can play a useful role in identifying improved maintenance, rehabilitation and management techniques that will enable cities to stretch their highway dollars and increase the effectiveness of their activities. We'd like to thank all the cities that responded, and encourage those that haven't responded to complete the survey form and return it.

Results were classified by city population and are presented in tables on this page. It was found that West Virginia cities spend annually large sums of money to maintain local streets and highways. The average budgeted amount ranges from $8,633 per yer for cities under 1000 population up to $1,277,714 for cities of over 20,000 population, with the average number of full time employees who maintain streets and highways ranging from .16 up to 45.7, respectively. The cities with populations over 20,000 have an average fleet size of 21.9 vehicles, (dump trucks, pickup trucks, street cleaners, and other vehicles) while those cities under 1000 population average only 1.4 vehicles. The average number of bridges under municipal jurisdiction ranges from 10.5 in the largest cities down to .20 in the smallest cities.

The majority of the cities over 1000 population have responsibility for traffic signal installation and maintenance. And it was found that municipal police are responsible for a variety of traffic management duties that involve traffic engineering. This trend was strongest for cities in the 5000 to 20,000 population range. In 70% of the cities in this category, police are responsible for locating loading and no parking zones, stop signs, and warning devices; in 60% the police are responsible for selecting one-way streets and establishing turn prohibitions at intersections; and in 50% the police set

SURVEY OF MUNICIPAL STREET AND HIGHWAY PROGRAMS IN WEST VIRGINIA

	CITY POPULATION			
	0-999	1,000-4,999	5,000-19,999	20,000 and over
1. Number of Cities Surveyed	108	93	18	8
% Responding	23%	39%	75%	88%
2. Average Annual Street and Highway Budget	$8,633	$57,105	$124,664	$1,277,714
3. Average Number of Employees who Maintain Streets and Highways				
A. Full Time	.16	2.6	6.9	45.7
B. Part Time	1.72	3.4	4.8	6.7
4. Average Vehicle Fleet Size				
A. Dump Trucks	.44	1.8	3.8	10.0
B. Pick-up Trucks	.72	1.8	3.1	3.9
C. Street Cleaners	0	.6	1.1	2.4
D. Other Vehicles	.20	1.3	2.5	5.6
5. Average Number of Bridges Under Municipal Control	.20	.75	1.4	10.5
6. Percent of Cities with Responsibility for Traffic Signal Installation and Maintenance	20%	58%	60%	86%

POLICE RESPONSIBILITIES IN MUNICIPALITIES

	CITY POPULATION			
	0-999	1,000-4,999	5,000-19,999	20,000 and over
Percent of Cities in which Police have Responsibility for				
1. Timing and Setting Traffic Signals	8%	22%	50%	43%
2. Locating Loading and No Parking Zones	16%	47%	70%	28%
3. Locating Stop Signs and Warning Devices	24%	61%	70%	14%
4. Selecting One Way Streets and Establishing Turn Prohibitions at Intersections	16%	41%	60%	14%

and time traffic signals. A somewhat lower percentage of cities in the 1000 to 5000 population range report police responsibilities for these activities, and the lowest per centage was found for the largest cities (over 20,000 population) and the smallest cities (under 1000 population).

Additional questions asked about information needs of cities.

Indicated responses included that highest overall preferences were for more information on funding, drainage problems, ditching and grading, pot-hole repair vehicle replacement, and snow and ice removal. A somewhat smaller number of cities asked for information on maintenance equipment, street-cleaning, contract specifications, parking management, traffic signals and signs, traffic impacts, computers and software, tort liability, pavement markings, bridge maintenance and repair, dust control, and accident investigation and analysis. Future seminars and newsletters will address these topics.

* * *

A final contract to bring the turnpike up to Interstate 77 standards was awarded to replace the deck of the Yeager Bridge over the Kanawha River and modify its approaches.

Also awarded was the final contract for improvement to US 52. Known locally as the TOLSIA Highway for the Tug-Ohio-Levisa-Sandy Improvement Association, which championed the improvements during the 1960s, the US 52 routing totals approximately 53 miles through Wayne, Mingo and Logan counties.

Establishing a Permit System for Utility Cuts

Highways are constructed and maintained for the purpose of movement of vehicles and pedestrians. However, individuals and utility companies often wish to utilize highway rights-of-way for other purposes. In order to prevent recurring, dangerous and annoying interruptions to traffic and pedestrians and to avoid interference with future construction, strict control and standard procedures for excavation and construction within a city highway right-of-way are necessary.

A permit system must be explicit and uniformly applied (to municipal agencies as well as contractors). A system that makes the utility responsible for the care and maintenance of a patch, for at least a year or two after opening, can greatly reduce the amount of personal inspection by the town. The utilities also find that it is cheaper to do a thorough job the first time.

The Public Works Department of Worcester, Massachusetts has offered their permit manuals as an example for other communities to use in implementing a permit system. This community has offered to mail the booklet to any requestor if they enclose $1.00 to cover the postage. The address is:

Mr. F. Worth Landers
Commissioner of Public Works
City of Worcester Department of Public Works
20E. Worcester Street
Worcester, Massachusetts 01600

Road Surface Management for Local Governments—Six Case Studies

This informative report examines the road surface management practices and intergovernmental cooperation of six local governments across the United States. Road surface management is defined as the application of pavement management principles to the needs of local governments, including the management of light-type pavements and unpaved surfaces. Any governmental agency that has road and street responsibilities has road surface management procedures. Some may be well thought out programs based on current technology and some may be very informal, based upon the judgement and experience of long-term employees. The purpose of this report is to identify areas where current road surface management practices might be improved, with the emphasis on building upon the better features of current practices rather than advocating the implementation of dramatically different and sophisticated systems.

DOT-1-85-06 Distributed in Cooperation with Technology Sharing Program
Office of the Secretary of Transportation
Washington, D.C. 20590

Hot-Mix Bituminous Paving Manual

This report has been developed to address the area of asphalt pavement construction. It includes as an introduction, the identification of some major pavement distresses. It then addresses the major phases of materials and mix design, hot-mix plants, placing hot mix, compaction and then concludes with a more detailed look at asphalt pavement performance. It includes many useful visual aides such as charts, graphs, and photos.

Developed by: Federal Highway Administration, Office of Highway Operations, Construction & Maintenance Division, Geotechnical & Materials Branch

Available from: The National Technical Information Service
Springfield, VA 22161

* * *

The renovation of the Wheeling Suspension Bridge has been awarded first place in the 1984 Biennial Awards, "Excellence in Highway Design," a national competition sponsored by the Federal Highway Administration.

AROUND THE STATE

At a February 13, 1985 press conference, Gov. Moore announced the appointments of William S. Ritchie, Jr. as Commissioner of Highways, David G. Allen as Deputy Commissioner and J. Craig Rothwell as Assistant Commissioner.

Administrative Vice President of Ashland Oil, Ritchie had previously served as Commissioner from 1969 to 1977, bringing the Department to the nation's top ten in construction contracts awarded in 1970, 1971, 1972 and 1973. During his eight-year term as Commissioner, Ritchie was the recipient of an award for outstanding service in the field of conservation from the West Virginia Soil and Water Conservation Association and served on the board of American Road Builders Association and as president of the American Association of State Highway and Transportation Officials.

Vice president of the J. F. Allen Construction Company since 1973, Deputy Commissioner Allen served the governor's transition team on the Highway Task Force, the 35-year-old Clarksburg Chamber of Commerce Roads and Transportation Committee, and has served as chairman of the West Virginia Flexible Pavements Council.

A former employee of the Department's Project Control Division, Assistant Commissioner Rothwell has over nine years of experience in planning, project scheduling and project funding.

* * *

How did everyone make out with snow removal this year? After a winter like this you all probably have lots of thoughts and ideas about what you did, should have done, or would like to do next year. While they are still fresh in your mind, write down some of your experiences or questions and send them in so we can share them and maybe come up with some answers.

Has anyone done a back to back comparison of a PTO spreader versus an auxiliary powered unit?

How about gravel versus cinders or fly ash - which works best for you?

Has anyone tried a new deicing agent? Write or phone us!

UNPAVED ROADWAYS

Many miles of West Virginia roads remain unpaved. These roads often carry local traffic between farms and villages and serve as links connecting paved highways. Therefore, maintenance of these roads is very important.

The surfaces of unpaved roads consist of natural earth, sand, stone, gravel, slag, red dog or cinders. Frequent inspection of these roads is required for good maintenance. The surface of an unpaved road must be graded and compacted as required. This should be done in the spring as soon as the frost leaves the ground or as soon as possible after a rain while the surface materials are still moist but not wet. Grading during dry weather may actually do more harm than good since moisture rebonds the materials.

The surface should be shaped with a proper crown so that surface water will travel quickly from the roadway to shoulders , ditches and inlets. Each of these drainage facilities should be inspected to see if it needs cleaning or repair.

The roadway should be graded so that windrows are not left at the edge. A scarifier maybe used to eliminate ruts or corrugations. On heavily travelled roadways prone to potholes, it may be desirable to recompact the surface after it has been graded and scarified. If new material such as recycled asphalt pavement or aggregate is added, it should be graded and blended before compaction.

Soft spots are caused by inadequate drainage or lack of stabilized material. Drainage in these areas should be inspected to see that it functions properly. If the soil appears to be in poor condition, it can be replaced with a suitable material such as slag, stone, or gravel.

The formation of dust can be prevented by applying an additive such as calcium chloride, sodium chloride or bituminous materials. Additives can often serve as a stabilizing agent as well as a dust pallative.

SHOULDERS

Shoulders are the graded area or surface adjacent and parallel to the travelled way and can be either turf, stabilized, paved or a combination type. Shoulders give lateral support to the road surface and provide for emergency stopping. Properly sloped and maintained shoulders aid in the quick removal of surface water from the roadway into the drainage system. Hazardous shoulder conditions which usually result from the gradual wear of traffic and the presence of water include low shoulders, pavement drop-offs, raised ridges of grass and excess materials which pond water along pavement edges, ruts, and erosion.

Shoulder maintenance can be performed throughout the year. Because the failure of a pavement often starts at the inside edge of a shoulder, this phase of highway maintenance is very important.

The following is a list of items that should be completed:

1. Field inspection of shoulders to determine the amount and type of maintenance required and the priority of the work.
2. Patching paved shoulders.
3 Grading, rolling and applying dust pallatives to earth or stabilized shoulders to attain proper grade and slope, and to remove false, or secondary ditches.
4. Cutting high turf shoulders and refilling scoured areas to ensure proper drainage. Rip-rap or large stone can be placed in eroded areas to prevent further damage.
5. Surface treating or paving stabilized, paved or combination type shoulders as necessary.

Special attention should be given to mailboxes and driveways. Proper drainage and shoulder widths must be maintained across driveways to prevent ponding or icing conditions. Improper drainage in this area is also often a direct cause of failure of the roadway surface. Driveway permits should be reviewed carefully to see that drainage is accomodated.

RECOMMENDED METHOD OF LIMB REMOVAL

UNDERCUT 1/3 WAY THROUGH LIMB 12" FROM MAIN STEM

SEVER LIMB ABOVE FIRST CUT TO RELIEVE WEIGHT

UNDERCUT STUB TO PREVENT STRIPPING BARK

FINAL TOP CUT LEAVING NO TRACE OF STUB

Taken from: PennDOT Maintenance Manual

DRAINAGE

The importance of drainage cannot be overemphasized in road construction and maintenance. Surface and subsurface water must be carried away economically, efficiently and safely to prevent further damage.

Rainfall, melting snow and ice are sources of surface water. Three general objectives in the drainage of surface water are:

1. Surface water on the roadway and shoulders must be allowed to run off to a suitable point of discharge such as an inlet or culvert without causing damage.

2. Surface water from adjacent areas must be prevented from reaching the roadway shoulders and side slopes through the use of gutters, ditches and pipes.

3. Surface water flowing through a natural or man-made watercourse should pass through embankments or hills in drainage facilities of adequate size and type.

Subsurface water can come from underground springs, seams in rock and from passage between particles of a pervious soil (water can pass through this type readily) and an impervious soil boundary. Proper drainage prevents subsurface water from collecting under the roadway.

Maintenance personnel must see that drainage facilities are kept in good working condition. Periodic inspections can assure that hidden obstructions have not been overlooked. The best time to inspect highway drainage facilities is right after a heavy rain.

A surface drainage system has four components:

Road Crown. The crown or superelevation of the road surface allows water to run off to the side ditches. The crown of a roadway is the amount the center of the roadway is higher than the edges. An unpaved roadway should have more crown than a paved surface.

Shoulders. Shoulders are an extension of the road surface and allow for the continued flow of water to the ditches. Shoulders should have a cross-slope and be uniformly graded.

Ditches. Ditches carry water away from the roadway. They often run along side and parallel to the roadway. Ditches need to be kept clean and protected from erosion. In erosive soils; the drainage channel should be rock-lined if possible. Water left in a ditch can sometimes leak back into the pavement foundation materials.

Proper drainage helps to keep this roadway in good condition. Notice how the shoulders are graded to aid in the removal of surface water. Inlets should be inspected and cleaned if necessary.

Culverts, Inlets, and Catchbasins. Culverts usually channel water from one side of the road to another, helping to control the flow of water and slowing it down to reduce erosion. Catch basins and inlets are frequently found at the intersection of pipe lines, at the inlet end of culverts or at various points along a long pipeline. Their purpose is to collect surface and subsurface water, change the direction of water flow and reduce water velocity. Grates are used on inlets to catch debris.

Some major defects of surface drainage systems are:

1) Scour at the inlet end of pipe. This scour is caused by turbulance that results when more water is collected at the inlet end than can be rapidly discharged by the pipe. In this case, the pipe may be too small, poorly located or the entrance may be blocked by silt and debris. If the pipe is too small, it should be replaced with a larger pipe. A pipe should be relocated if necessary. A headwall or rip-rap can help to protect the area near the culvert.

2) Scour at the outlet end of pipe. This scour is caused by the rapid, uncontrolled discharge of water that erodes the outlet channel. Undermining and failure of the outlet endwall can

result. A concrete or stone apron should be build on the spillway beneath the end of the pipe.

3)Clogging of the pipe by silt and debris. When the pipe has insufficient grade, this condition is common. A permanent solution is to relay the pipe with a steeper grade to make it self cleaning. Otherwise, the pipe must be cleaned frequently.

4) Rusting and Corrosion. This usually occurs along the invert of a metal pipe. In acidic water, the metal pipe should be replaced with a concrete pipe.

There are two general classes of subsurface drains. An interceptor drain diverts the ground water before it can reach the roadway. An underdrain is intended to catch and dispose of any water that gets into or under the roadway. The two types of subsurface drains are:

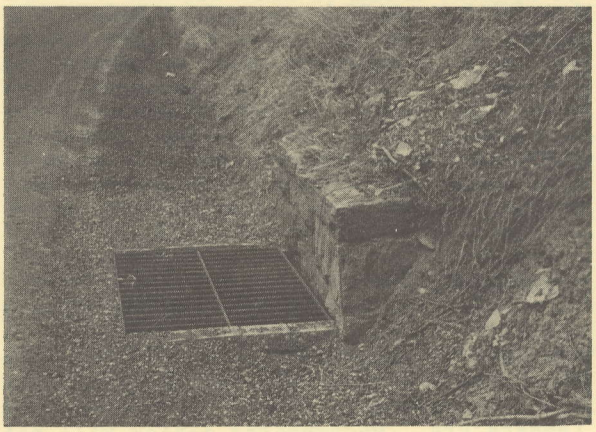
1) French or Stone drains. A French drain is constructed by digging a trench and filling it with crushed aggregate. A properly constructed French drain works well for a long time. The material used for backfilling should be a small size aggregate since a course aggregate backfill tends to fill with muddy soil and clay. It is best to use a French drain where there is not a large flow of water.

2)Pipe Underdrain. Pipe underdrain consists of perforated vitrified clay pipe, cradle invert vitrified clay pipe, perforated bituminous fiber pipe, porous cement concrete pipe or perforated asbestos cement pipe. Only one class of pipe should be used for a single installation and pipe should be placed with perforations down. The pipe permits the water to escape, while granular back-fill acting as a filter will keep soil out of the pipe. Extreme care should be taken in placing this pipe in order for it to function properly.

It is important to prevent surface water from getting into the trench of a subsurface drain because it would overload the drain and wash fine particles of soil into the filter material. Surface water must be removed by surface drainage, therefore an impervious boundary such as a clay soil or tar paper and straw should be placed on top of the subsurface drain trench.

* * *

This damaged pipe and end wall should be repaired to allow proper drainage of surface water.



Water is not able to flow into this inlet because the grate and casting are too high. They should be lowered.

The outlet end of this pope should be cleaned to remove the build up of silt and debris.

SEALING PAVEMENT CRACKS AND JOINTS

Pavement joints are sealed to keep water and foreign material out. If water does reach the subbase, it will cause soft spots, frost action and finally, heaving in concrete pavements and alligator cracking in bituminous pavements. Pavements cracks and joints should be inspected periodically (at least once per year) and where necessary sealed using the procedure described below. There are a number of manufacturers who supply material for sealing cracks and joints.

Preparation of Joints and Cracks for Sealing

Signs and other safety control devices should be placed before starting work. Joints and cracks should be cleaned of all loose scale, dirt, dust, mortar, aggregates, old sealing compound and other foreign matter. This should be done with a stiff broom. Just before the actual sealing operation, blow the cracks out with compressed air as shown in Figure 1. Priming is required when resealing cracks or joints which have previously contained sealing material different from the new one. Priming is done by swabbing the crack walls with naptha, varnelene, varsol, or other solvent.

Placing the Sealer

Fill cracks and joints with liquid asphalt using a pouring pot and a squeegee as shown in Figure 2. Be sure that the sealing material is heated to the manufacturer's recommended temperature. Underheated sealer will not flow properly. If the sealer is overheated it should be discarded; overheated sealer will have its elasticity damaged. The material should be poured as soon as possible after the pouring temperature is reached.

Be sure the right amount of sealing compound is applied. Too much will heave (pull out) when traffic passes over. Too little will not provide a sufficient seal. Use a little less sealant in colder weather while more should be used in hotter weather to allow for contraction and expansion.

Be careful not to overfill the crack or joint and cause excess asphalt on the surrounding pavement. Any spillage of sealing material on pavement areas should be immediately removed.

Traffic is permitted on the pavement after the joint sealer has cured enough so that it will not be picked up and tracked by vehicle tires. Alternatively, the surface may be sprinkled with dry sand to prevent pickup by traffic as shown in Figure 3. Before leaving the site, clean up the area and remove traffic control signs.

Fig. 1

Cleaning Out Crack With Broom And Air

Fig. 2

Sealing With Pouring Pot And Hand Squeegee

Fig. 3

Sprinkling Surface With Dry Sand

Source of Figures: Field Maintenance Manual for Georgia Counties Local Roads and Streets, FHWA, August 1979.

QUESTIONS & ANSWERS

Pavement Milling

QUESTION: Over the years the city has resurfaced our main street several times. This has resulted in a loss of curb reveal, recessed utility meters and a decrease in the size of the curb inlet opening. We will be resurfacing the street again in the future. Are there any measures we can take to alleviate this problem?

ANSWER: A milling or planing machine can remove the existing bituminous material to a specified depth in order to establish a suitable cross-section of the roadway surface in preparation for a resufacing application. This operation may be used where it is not desirable to modify existing curb or shoulder grade lines or to minimize the excessive buildup of surface material in curbed areas.

Milling machines can remove partial depths of material while leaving the subbase undisturbed. Ripper/loader techniques must remove full depths and usually require base work. In addition, traffic flow can be maintained around most milling operations, and the remaining surface can carry most traffic until it is resurfaced. Total excavation by ripping and loading can be less expensive, but the material often needs additional crushing. Milling machines usually produce a fine material that can be recycled for use in roadway pavements or in shoulder reconstruction. The reuse of this existing pavement has proved to save tremendous amounts of energy and materials. A milling machine may be available either through several contractors as part of a resurfacing project done by contract or can be purchased or rented through equipment rental/supply companies. The costs associated with this operation vary according to the size and location of the project. It may be possible to lower the mobilization cost if adjacent municipalities coordinate the scheduling of one machine or contractor for their projects. The real answer to this overall problem should be considered at the time the roadway is being resurfaced. If milling is included when curbed streets are resurfaced, this buildup can be prevented.

* * *

Scheduled to be finished in the very near future, the East Huntington Bridge is a distinctive asymmetrical cable-stayed girder. The structure, which links Huntington's 31st Street with Ohio 7 in Proctorville, is 2,841 feet long, with 62 cables connecting the deck to a single 370-foot-tall A-shaped tower.

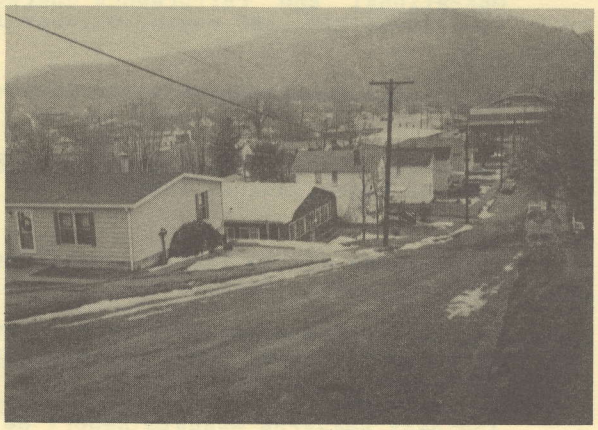
Chip Seal Experiment in Paden City

Robert Cecil, Street Commissioner of Paden City, West Virginia, reports that he has found the solution to that town's resurfacing problems. Faced with a limited budget and four and a half miles of unimproved city streets which were demanding most of his maintenance funds, Mr. Cecil did some experimenting to find a low cost durable surface treatment.

After examining chip seals and several mixtures of his own, he says he has found a surface which fits his needs. One inch of SK-3 tar emulsion is spread directly on the dirt and gravel road followed by three inches of number 8 pea gravel. Compaction with a two ton roller completes the job with no bleed-through of tar. After about a month of use, Mr. Cecil reports that the loose gravel displaced by traffic can be reclaimed.

The residents of Paden City were skeptical of the success of such a low cost process, costing them only fifteen cents per square foot. But, according to Mr. Cecil, they are delighted with the results. His original experiment has now been in use for three years and he has reopened a hillside road which has been impassable for fifty years.

For more information on this surface treatment give Robert Cecil a call at (304) 337-8798.



Robert Cecil of Paden City, West Virginia

Equipment Inspection Hints

Here are some guidelines to follow when inspecting equipment. These items could be used as a checklist when making routine inspections.

Adjustments
- Clutch Pedal Clearance (free play travel should be 1-2")
- Brakes (delayed stops, heavy pedal pressure indicate problems)
- Steering (free play at steering wheel requires adjustment)
- Fan Belts and other belts/tension (if too loose, cracked or frayed)
- Engine Idle Speed (too slow/fast)
- Tailgate Latch Linkage (hooks that won't latch should be repaired)

Cleanliness
- Cosmetic - clean cab and bed
- Safety Items - lamp lenses, reflectors, windshields
- Working Parts - engine, etc.

Cracks or holes in vehicle should be reported

Damage or Abuse
- Collisions
- Poor operation habits especially noticeable in clutch, brakes and tires

Leaks
- Engine Oil
- Transmission Fluid
- Coolant
- Hydraulic Fluid
- Fuel
- Power Steering Fluid

Loose or Missing Parts
- Usually visible but should be reported

Lubrication
- Very Important maintenance item

Noises
- Can prevent further damage if detected early

Performance
- How well does the equipment do its intended work?
- Is the operator properly trained to use the equipment?

In many instances a major breakdown can be avoided by making frequent inspections of equipment and proper scheduling of maintenance.

* * *

Free Publications

The following publications are available free-of-charge from the Transportation Center by writing or calling 293-4550.

Operational and Performance Characteristics of Drum Mix Plants, Report No. FHWA-TS-84-212, 198 pages, October 1984.

Hydrology, Report No. FHWA-1P-84-15, 342 pages, October 1984.

Pavement and Shoulder Maintenance Performance Guides, Report No. FHWA-TS-84-208, 42 pages, August 1984.

Proceedings of the Fourth Annual Pedestrian Conference, Report No. FHWA-TS-84-218, 341 pages, July 1984.

Paying for Transportation at the Local Level: 17 Strategies, American Public Works Association, Institute of Transportation, 24 pages.

Accident Research Manual, Report No. FHWA/RD-80/016, 150 pages, February 1980.

Mastering Traffic Engineering, MTMC Pamphlet 55-16, Volume III, 64 pages, August 1981.

A Basic Asphalt Emulsion Manual: Volume I, Understanding and Using Emulsions, Report No. FHWA-1P-79-1, 189 pages, January 1980.

Municipal Streets Workshop on Pavement Management

June 11, 1985

Date: Tuesday, June 11, 1985
Location: Laurel Room, Mountainlair, West Virginia University
Time: 9:40 a.m. to 4:15 p.m.
Who should attend: Municipal Engineers, Directors of Public Works, City Managers, Directors of Street Departments and their Staffs, and local elected officials who have responsibility for streets

This seminar will provide useful information to those involved with the management of municipal streets. It will provide an opportunity for these people from throughout West Virginia to meet and discuss their problems, exchange ideas, and present their needs. We encourage you to attend. The registration fee, which includes lunch at the Mountainlair and workshop materials, has been kept low on purpose to permit as many as possible to attend. Beginning and ending times have been set to eliminate the need for overnight accommodations for people traveling from many West Virginia cities. For further information, call 293-~~4450~~ 4550; or write to the National Transportation Center.

9:15 - 9:40 Registration and Coffee

9:40 - 9:45 Welcome

9:45 - 10:30 Pavement Management - Overview , Don Deuterman, Federal Highway Administration

10:30 - 11:15 Behavior of Rehabilitated Pavements, T.V. Ramakrishna, West Virginia Dept. of Highways

11:15 - 12:00 Pavement Drainage, Pat Ring, Geotechnical/Pavement Engineer, Federal Highway Administration

12:00 - 1:00 Lunch - Mountainlair

1:00 - 1:45 Concrete Pavement Rehabilitation, Atul Kantawala, Pavement Engineer, Pennsylvania Dept. of Transportation

1:45 - 2:30 Milling Machines and Overlays, Representative from Anderson Equipment Corp.

2:30 - 2:45 Coffee Break

2:45 - 3:15 Cornell University Film on Potholes

3:15 - 4:00 Round table discussion on: "Setting Priorities in Pavement Maintenance and Rehabilitation and Documenting Budget Needs at the Municipal Levels" Representatives from West Virginia Municipalities

4:00 - 4:15 Concluding Remarks

Return to:
National Transportation Center
Evansdale Library Rm. G-7
Morgantown, WV 26506-6105

Fee:
$9.00

Make check payable to:
WVU FOUNDATION

Registration form
WORKSHOP ON PAVEMENT MANAGEMENT
June 11, 1985

Name: _____ Title: _____
Name: _____ Title: _____
Phone: _____
Agency: _____
Address: _____ City _____
State: _____ Zip: _____

Registration must be received by June 3.

COUNTRY ROADS & CITY STREETS

West Virginia University

West Virginia Municipal Street and Highway Information Program
Harley O. Staggers National Transportation Center

COMING UP IN NEXT NEWSLETTER

- SNOW AND ICE CONTROL
- SIGN VANDALISM
- PARKING MANAGEMENT
- TORT LIABILITY
- WORK ZONE TRAFFIC CONTROL
  AND MORE...

* * * * *

DON'T FORGET PAVEMENT MANAGEMENT SEMINAR
ON JUNE 11, 1985 IN MORGANTOWN, WV

* * * * *

West Virginia Municipal Street and Highway
Information Program
Harley O. Staggers National Transportation Center
Evansdale Library, G-7
West Virginia University
Morgantown, WV 26506-6105

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