

The Center Line

Local Technical Assistance Program

Serving North Dakota Transportation Agencies

North Dakota Transportation Technology Transfer Center

North Dakota State University

Palmer Paulson, Barnes County Commissioner

by Vernon Monger, ND LTAP

Several of our readers have inquired about the county commissioners, and how they are involved in the transportation programs of the county. With that in mind I thought it might be interesting to feature one of our commissioners.

Palmer Paulson is chairperson of the Barnes County commission, a 5 member board.

Barnes county is located in the eastern part of the state. Valley City is the county seat. Palmer has been on the commission for the past 14 years.

Palmer has been a lifelong resident of Barnes County. He and his wife Maxine reside in the Sheyenne River valley north of Valley City. He has been a farmer and rancher in the area.

His proudly says his galloway cattle have been shipped throughout the world.

Palmer became involved in local government at an early age. He served as a township supervisor for a period of 15 years, 30 years on the county zoning board, and spent a few years as a school bus driver in his area. He has had a lifetime commitment to the betterment of his community and the area.

The responsibility and duties of a county commissioner are varied, being

required to be involved in all activities pertaining to the public such as governmental agencies, public lands, employees, etc. One major activity is management of the road system and to quote from the North Dakota Century Code, "the board of county commissioners in their respective counties shall have the sole authority and responsibility to acquire land for, construct, maintain and operate the county road system as designated and selected by them".

Palmer, along with fellow commissioner Roger Berntson, have the "roads" portfolio and oversee the operation of the roads department. Kerry Johnson is the Highway Supervisor and

manages the day to day operation of the road department. Palmer states there are many road activity items brought to the commission for action from the Supervisor as well as the public and other state agencies.

Palmer has a major concern for the safety of the public traveling on the roadways. While he would like to see all roads brought up to desired standards, there just isn't enough funding for this.

They do have a 15 mil levy for the road



Palmer Paulson,
Barnes County Commissioner

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Routing Slip

Don't file this newsletter too quickly. Read it, photo-copy what you want, sign below, and please pass it on - especially to the front line troops.

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Palmer Paulson, Barnes County Commissioner


department to assist with construction of some of their roadways to go along with the federal and state aid. They do have to research wisely to determine the most needed improvements relative to the safety of the public. For instance, he would like to see more paved roads on the higher traffic volume roadways, however the funding is not available.

Palmer states the time required to carry out the commissioner duties has grown considerably in the time he has been involved. It now approaches that of a half time position. Computerization in all the agencies has taken place during his tenure. Changes to the new federal and state programs require considerable time to implement, with insufficient funding to do all the things he would like to see done leading to frustration on the job at times.

Along with some of the frustrations there are good things happening. The river road north and south of Valley City was designated as a "Scenic Byway", a beautiful drive in the Sheyenne river valley. A new shop was built for the road department. After a fire in February of 2002 destroyed the old shop, it became necessary to locate to new quarters. He feels the county roadway system is gradually improving with many safety improvements being made. The road department employees are doing a very good job of maintaining over 2000 miles of existing roadway along with assisting on the township roads.

Palmer has been very supportive of the LTAP program and the training activities available to the road department personnel. He has attended some of our training programs, attends the NDACE and Local Roads conferences. His road department employees are always actively participating in the training activities of LTAP. Palmer feels funds

spent for training of employees are a necessity and the county and the public come out ahead by having better trained employees doing a better job. The county, public and employees are rewarded by the training.

Palmer states that while there are frustrating days with all the problems and concerns of the county, there is also a lot of satisfaction derived from the action he and other commissioners take relative to improving conditions for the residents of the county and the public in general. Therefore he is a candidate for reelection to the position in November. Good luck, Palmer. 

ROAD SAFETY AUDITS

FHWA recently developed a new brochure that provides an overview of road safety audits (RSA). The brochure defines RSA's, discusses typical low-cost improvements, steps on how to conduct RSA's, keys to successful implementation, benefits, and available resources. This brochure can help market road safety audits to State and local agencies and Tribal Governments. For copies of the brochure, please visit FHWA's web site at: <http://safety.fhwa.dot.gov/rsa/sa04004/0404rsa.pdf> or contact Louisa Ward at Louisa.Ward@fhwa.dot.gov.



MEET ADVISORY COMMITTEE MEMBER BLANE HOESEL, North Dakota DOT Local Government Representative

by Vernon Monger, ND LTAP

Blane Hoesel represents the DOT Local Government on our advisory committee and has been their representative for the past 3 years. Blane is a Senior Manager for Local Government working with the county road activities. His main responsibilities are ensuring that proposed county projects meet federal requirements in order to obtain federal funding. He deals mainly with project concept reports, environmental issues, right of way issues and the scheduling of individual county programs. Prior to this he was involved with the geotechnical activities of the Materials and Research Division of the DOT. He has been with the DOT for 14 years and prior to that was with a construction company.

Blane received his associate degree in Civil Engineering Technology from North Dakota State College of Science in 1979 and his Bachelor of Science degree in Construction Management from North Dakota State University in 1981.

Blane is an avid outdoorsman, being involved in hunting and fishing, woodworking and an avid horseman. He makes an occasional trip to the mountains on elk hunts, although he says he sometimes feels fortunate to just see one.

When asked about his thoughts on LTAP (T2C) training activities, he feels strongly that the technical assistance given to the locals is very worthwhile, and that the formalized training programs should continue. Like with everything, he feels that some counties are not taking full advantage of the training opportunities available in this program.



Blane Hoesel, ND DOT Senior Manager for Local Government

Blane grew up in New Salem and he and his wife JoAnne reside north of Bismarck, where they are involved in raising Morgan horses. Blane claims to raise Morgans for a living and work at the DOT as a hobby. 🍌



WINTER ROAD MAINTENANCE

by Vernon Monger, LTAP



North Dakota winter road conditions near Williston.



North Dakota winter road conditions near Williston.



North Dakota winter road conditions near Williston.

As fall comes around it is time to think about winter conditions and get our equipment operators and equipment in order for a change in work activities. The last few winters have been quite mild, not requiring a lot of time for snow and ice removal. We must recall the winter of 1996-97 to remember how severe our winters can be, and this could happen again at any time.

It is always a good idea to critique the previous winter's activities and determine what went right, what went wrong, determine whether we adequately served the public by keeping the roads and streets to their expectations. If there were problem areas it should be determined how we can correct them.

Many agencies always have a turnover of personnel and new employees with no snow plowing experience are hired. It is necessary to have training for these employees. It is also necessary to have refresher training for the other employees.


The last several years the DOT has been involved in anti-icing (before the snow hits) as well as de-icing, with the use of liquid chemicals. They have become more pro-active, to keep the compacted snow and ice off their roadways and feel this has been successful. If you have a desire to learn more about their procedures stop in to the local DOT district maintenance yard and find out more about their procedures, equipment and materials.

Some items of concern to discuss with employees are:

1. Review of winter maintenance policies- snow removal routes, procedures for helping motorists,

importance of personal and public relations with motorists, radio communication, and working with law enforcement, emergency work.

2. Equipment - preventive maintenance procedures, emergency repair and refueling.
3. Snow removal and sanding operations - during storms, cleanup operations.
4. Safety and safety practices - clothing, first aid treatment for hypothermia and frostbite.

We have several videos at the LTAP center that can be very beneficial for training. Some of them are "Snow Removal techniques" (No. 238), Snowplow Safety (No. 197) and H Series Motor Grader (Snow Removal Applications-# 258). We will also be holding our regularly scheduled winter maintenance training sessions at two locations in October. If this is not convenient for you, we can also arrange for a mini-training session at your shop. 

Basic Surveying Workshop for Local Road Departments

by Vernon Monger, ND LTAP

Our LTAP center sponsored the second "Basic Surveying Methods for Local Road Departments" workshop which I attended and assisted with. This was held at the NDSU Extensions Services at Minot and the Stutsman County Road Department at Jamestown, and involved field work as well as classroom activities. Therefore it required a location where

we had classroom space as well as an outdoor work area.

Frank Peloubet, our LTAP Center Program Manager, was the instructor. Frank also teaches a summer survey course at the Civil Engineering Department at NDSU.

Frank kept it very interesting by identifying ways of determining relative positions of objects without the use of equipment or very limited survey instruments. The one day course was approximately one-half classroom and the remainder field activities.

Field activities consisted of Pacing, Determining slopes, Staking Ditch Slopes, Culvert Installation and Marking off-set grade stakes. The attendance was limited in order to keep the field crews to three or four individuals in each group. Each group was given a limited amount of basic equipment to accomplish the task.

The attendees found this to be very interesting and informative. One equipment operator said, “this is very good for me, I do most of the dirt moving in our county and with this knowledge I can do so much more on my own and not have to wait for a surveyor”. A supervisor indicated that his employees need this knowledge so they don’t always have to wait for someone to do minor survey work for them, but can tackle a task on their own.

The survey course is one of the available courses for the “Road Scholar Program”. Therefore, it will be offered again next year at other locations. Because of the need to control and monitor the field activities the attendance will again be limited to 20 at each session. ▮



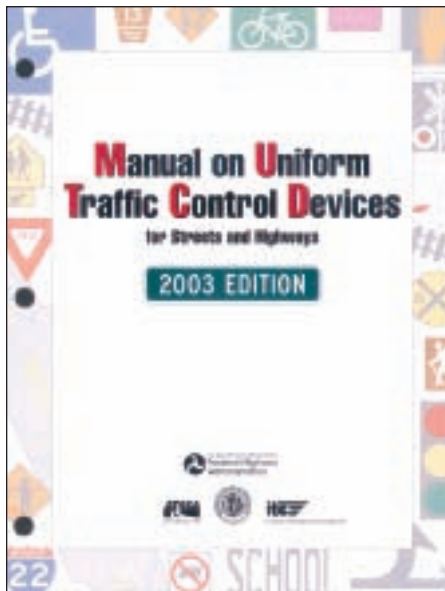
Off-set Grade Staking Crew



Mark Verke (wearing red shirt) with Culvert Installation Crew



Slope Measurement Crew



North Dakota DOT Director Adopts the 2003 Edition of the FHWA's Manual of Uniform Traffic Control Devices (MUTCD)

by Don Andersen, ND LTAP

With a simple one-page memorandum, ND DOT Director David A Sprynczynatyk adopted the 2003 Edition of the Manual on Uniform Traffic Control Devices (MUTCD) for use on all public roads, streets and highways in the state of North Dakota. The adoption became effective June 9, 2004. The Federal Highway Administration (FHWA) issued the 2003 MUTCD on December 22, 2003 and the individual states had up to two years to adopt the 2003 Edition or publish their own version.

The official version of the 2003 MUTCD may be found at <http://mutcd.fhwa.dot.gov> and copies may be purchased from several organizations such as AASHTO, ATSSA and ITE. Due to budgetary limitations, no general distribution will be made to local government agencies.

Compliance dates for changes in the 2003 MUTCD may be found at the website listed above. Most changes related to traffic signing have fairly long lead times (in some cases up to fifteen years) to allow units of local governments to phase in the changes. In other words, when you take down an outdated sign that is either worn out or has been vandalized, it should be replaced with the new version specified in the 2003 MUTCD. ■

PEDESTRIAN SAFETY at INTERSECTIONS

by Tamara Redmon, FHWA Pedestrian & Bicycle Safety Program Manager



Pedestrian safety at intersections is a big problem. In 2002 (the most recent year for which complete crash data is available), 4808 pedestrians were killed in roadway related crashes. Of these, 1058 fatalities (22 percent) occurred at intersections.

Hazardous intersection types for pedestrian crossings include high-volume, high-speed and multi-lane intersections with complex signal phasing or without any traffic control at all. Pedestrians are at risk even at simple STOP sign or YIELD sign intersections because of the common disregard of traffic control devices by motorists. Traffic improvements that include widening streets, adding lanes and using traffic engineering solutions that increase vehicular efficiency can decrease pedestrian safety. Many intersection reconstruction projects and traffic control installations have increased the distances that one must walk to cross at an intersection.

In addition, intersection signal timings may be too short to permit safe intersection crossings. Traffic engineers may use a walking speed that is too fast for many pedestrians (i.e., the elderly, disabled, and children) in determining the necessary time for pedestrians to cross the street. Pedestrians have not been accorded equal status with vehicles at intersections. Roadways have been designed and constructed primarily to accommodate vehicular traffic rather than pedestrians.

Crash data consistently show that collisions with pedestrians occur far more often with turning vehicles than with straight-through traffic. Left turning vehicles are more often involved in pedestrian crashes than right-turning vehicles, partly because drivers looking for an opportunity to turn rather than focusing on crossing pedestrians. Right turn on red contributes to pedestrian crashes because it creates reduced pedestrian opportunities to cross intersections without having to confront turning vehicles.

Another problem with intersections is drivers not seeing the pedestrian. Pedestrian visibility to drivers is much poorer during hours of darkness, especially in areas where there is poor lighting on the road. This is a common shortcoming of rural and suburban intersections. In fact, half of all pedestrian fatalities occur between 6 pm and midnight (a 6-hour window).

How Can We Reduce Pedestrian Fatalities and Injuries at Intersections?

Although the problem is complex, there are many ways to improve pedestrian safety at intersections:


- **Increase Visibility.** Pedestrians need be more visible during evening and nighttime hours. Adding/improving roadway lighting is one way to do this. Another is to encourage pedestrians to wear reflective clothing and accessories.
- **Adjust signals:** Reassess the adequacy of pedestrian-signal timings; consider pedestrian-only phasing in a traffic signal cycle; and ensure that the pedestrian signal is visible and that any push-buttons are accessible. Signals may be supplemented with audible messages for visually impaired persons.

- **Identify and decrease road and traffic hazards:** Repair/re-stripe crosswalks and stop lines; improve lighting; provide additional signage where necessary; install barriers such as fences, shrubs, or uncomfortable median surfaces to discourage pedestrians from crossing at unsafe locations; provide a wide refuge island on a median.

- **Make crosswalk improvements** such as: A ladder pattern that is more visible to motorists; crosswalks with flashing lights embedded in the roadway pavement; and flashing “Pedestrian Crossing” signs that alert oncoming traffic to pedestrians in the crosswalk.

- **Coordination among engineers, educators and enforcement personnel.** Improved pedestrian safety at intersections requires coordination among public authorities, professional engineers, media, education experts and vehicle designers to reduce both the number and severity of pedestrian collisions. Pedestrian safety cannot be improved by traffic engineering alone.

- **Focus enforcement on:** motorist compliance with pedestrian safety laws; pedestrian compliance with pedestrian signals and appropriate crossing locations; and reducing speeding through intersections.

- **Education.** Develop a sustained, comprehensive public awareness campaign that reaches both motorists and pedestrians. The FHWA’s Safety Office has developed such a campaign that comes with ready-to use materials and is partially focused on intersections. The Campaign can be viewed at: <http://safety.fhwa.dot.gov/pedcampaign/index.htm>. 



How to Be a Better Team Player

by Robert Bacal, M.A.

More and more often, employees are expected to contribute to the performance and success of their work teams. While it sounds great on paper, it isn't all that easy to work in a team, since often team members are different in style, attitude, commitment and work ethic. If you are a work team member, supervise, manage or lead a team, take a good look at these tips and hints which will make it easier for team members to contribute more productively to their teams, and decrease friction among team members

Stop The Blaming Cycle

Often teams get bogged down in blaming members when things go wrong. As a team member you can do two things to stop this wasteful and destructive team behavior. First, eliminate blaming language you may use. Replace blaming and finger-pointing comments or questions with a focus on solving problems, or preventing problems. Second, if other team members get into the blaming cycle, step in and "turn" the conversation back to a constructive approach. For example, here's a good phrase: "Ok, maybe we could save some time here by trying to ensure that the problem doesn't happen again, so what can we do to prevent it next time?"

Focus on the Present & Future

This is related to the blaming cycle. Don't dwell on the past. Use the past (successes and team failures) to help the team determine where they need to go to improve. You can't change the past — you can only use it to learn from.

Stop Back Channel Talk

Talking about a team member in private with another team member usually involves a blaming process. While sometimes it's good

to vent frustration about a fellow teammate, you shouldn't be doing it within the team. It's counter productive, and harmful. Stop doing it unless you have a specific, constructive reason for doing so.

Personal Responsibility

Take responsibility for your behavior and the results that your team produces, but NOT the behavior of your team mates. When you take responsibility for another member's actions, you will tend to want to change your team mate, something that often creates dissension.

Finally, focus on YOUR contributions. Don't spend your time thinking about or telling team mates what THEY should be doing for the team. Think about what you can contribute, and how you can contribute more effectively. Then do it. For example, if you have a great suggestion, don't dump it in the group with the expectation that someone else will implement it. You offer to do it...after all it's your suggestion.

Robert Bacal is a noted author, keynote speaker, and management consultant. His most recent books include Performance Management - A Briefcase Book, and The Complete Idiot's Guide To Managing Difficult Employees. The Work911 Supersite contains many more free articles and tips on a number of workplace topics. Access it at www.work911.com. Robert Bacal can be contacted via e-mail at ceo@work911.com or by telephone at (204) 888-9290.

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COMING EVENTS

ND LTAP Center Events

Basic Surveying for Local Road Departments

October 5, 2004
Bismarck, ND
October 7, 2004
Grand Forks, ND

Winter Road Maintenance

October 12, 2004
Dickinson, ND
October 13, 2004
Devils Lake, ND

Winter Survival

November 2, 2004
Dickinson, ND
November 3, 2004
Williston, ND

Rural Road Safety Assessment

December 8, 2004
Minot, ND
December 9, 2004
Grand Forks, ND

*** Gravel Road Maintenance**

Beulah, ND
Carrington, ND

*** Asphalt Pavement Repair**

Oakes, ND
Bismarck, ND

*** Culvert Installation and Maintenance**

Devils Lake, ND
Mandan, ND

*** Traffic Signing and Work Zone Control**

LaMoure, ND
Stanley, ND

*** Dates and/or Locations to be Scheduled at a Later Time.**

COMPUTER CORNER



SUMMER 2004

by Russ McDaniel, ND LTAP

I have often written about how we encourage our computer program users to offer suggestions for how we might improve our products and we continue to do so.

In the Spring, 2001 issue of *The Center Line* I introduced you to Bob St. Pierre, Rod Smith and Ray Dubois - employees of the Spirit Lake Bureau Of Indian Affairs (B.I.A.) Road Department at Fort Totten, North Dakota. I should have included Clarence Greene with that group. These employees have offered a number of meaningful suggestions since that time but their latest is an exceptionally good one, I think, and one that we want to share with our readers. Rod Smith is the primary source of this one.

As I understand it, the idea for this program revision was generated because Rod had a problem negotiating a settlement for a problem with a piece of equipment that he felt should have been covered by warranty. The vendor requested documentation to demonstrate the hours the unit had been used and fuels consumed along with records of equipment service and maintenance activities.

Our existing MDMS reporting procedures provided much of this

information but not in the detail

needed. For example, the total cost of parts installed was recorded but did not provided a detailed listing of each individual part by part number, description and cost. In addition, this limited information was included in separate reports with equipment use in one, fuels in another and service and maintenance activities in still another.

So, their request was for an MDMS program revision that would allow them to record each part item by part number, description and unit cost. In other words, they want MDMS to provide much the same level of detail provided by commercial garages and equipment vendors when a user takes a piece of equipment to them for repair or when we take our personal vehicles to the dealer for service. And they wanted a revised report that included equipment usage, fuels consumed and equipment service and repairs combined in a single report as illustrated below.

The program changes needed to provide this level of reporting were extensive. It required creation of an additional setup database table to record parts by part ID, description and unit cost in much the same manner as the existing fuels setup table. A fourth page was added to the data entry and edit screen and a report was added that satisfied their reporting requirements.

While the advantages of these revisions are obvious, there are, of course, some obvious disadvantages too. The most obvious is that shop employees need to record the parts as they are installed. This is not a problem at the Spirit Lake agency because Bob, Rod and Ray are among some of most dedicated and conscientious guys I know but for other road departments with

ND LTAP Center Events

[cont.]

*** Bridge Inspection & Maintenance**

Bismarck, ND
Minot, ND

*** Dates and/or Locations to be Scheduled at a Later Time.**

Other LTAP Events

Roadway Safety Assessment SHOWCASE

Mendocino County, CA
September 28-29, 2004

Annual County Road Advisors Conference

October 19-21, 2004
Rapid City, SD

Other Events

APWA & LTAP

CLICK, LISTEN & LEARN

[http://www.apwa.net/
Education/](http://www.apwa.net/Education/)

TARGET FINANCE 3 - Creative Financing: Linking Budget Know How with Strategic Planning
August 12, 2004

Right-of-Way Cooperation for Consistency and Simplicity
August 18, 2004

ITE 2004 Annual Meeting & Products/ Services Exhibit

August 1-4 , 2004
Lake Buena Vista, FL

National Rural ITS Conference

August 22, 2004
Duluth, MN

AASHTO Annual Meeting

September 16-21, 2004
Philadelphia, PA

larger work forces, this level of reporting might be a problem.

Another disadvantage is that a report with this much detail, will allow only a single record per page so a report that covers and extended time period would include a great number of pages. Rod pointed out, however, that it would seldom be generated unless there is a special problem such as he described with the warranty settlement.

Although we have been working on this update for some time, it still is not ready for distribution. I paid them a visit in mid-July and learned that they are having a problem with it but Bob, the lead computer employee, was on vacation so I don't know the extent of the problem. However, I'm sure it is one we will resolve. The reason I'm so sure it will be resolved is because these guys won't quit until it is. ■

Other Events [cont.]

ARTBA Annual Convention
September 8-12, 2004
Boston, MA

APWA International Public Works Congress and Exposition
September 12-15, 2004
Atlanta, GA

ND Chapters of APWA, AWWA, & WEF Annual Conference
October 19-21, 2004
 Fargo, ND

National Transportation Training Directors (NTTD) & Transportation Curriculum Coordination Council (TCCC) Conference
Oct. 31-Nov. 3, 2004
Kansas City, MO

ATSSA Northland Chapter "How To" Conference
March 22-23, 2005
 Fargo, ND

PAGE: 1
DATE: 7/22/2004
Spirit Lake Road Dept.
DAILY JOB DATABASE REPORT (EQUIPMENT USE, FUEL & GARAGE REPAIRS)

Date, Operator, Road, Activity & Equipment I.D.

Date:	1/23/2004	Employee:	Bob	Reg. Hours:	1.00	Overtime Hours:	0.00
Road:		Activity:	#1				
Equipment:	644-Tribe	Hour/Odometer Reading:	121.44	Hours/Miles Used:	0.00		

Fuel Type, Quantity & Cost

Fuel 1	0.00	Units (Gal., Qt., Etc.) @	\$0.00 =	\$0.00
Fuel 2	0.00	"	@ \$0.00 =	\$0.00
Fuel 3	0.00	"	@ \$0.00 =	\$0.00
Total Units:	0.00		Total Fuel Cost	\$0.00

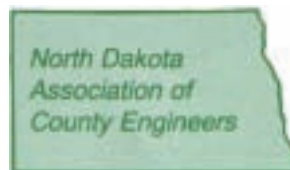
Repair & Maintenance Details

Part I.D.	Description	Cost (Each)	Quantity	Warrant	Total Cost
T74851	1/2"x 8"x 4' cutting edge	\$18.59	1.00	SHCP	\$18.59
771-8E18a	12-V AutoMate [4-DG]	\$11.00	1.00	SHCP	\$11.00
12-V-L-800	12-Volt battery, Automate,	\$59.95	1.00	SHCP	\$59.95
0287708	14.00x24 Gen. grader tire	\$389.62	1.00	SHCP	\$389.62
644G tires	23.5R25XTLA Mich.	\$1,492.76	1.00	SHCP	\$1,492.76
In-House Labor:	\$16.69			Total Parts:	\$1,951.92
Contract Labor:	\$0.00				
Total Labor:	\$16.69				

Repair Description: Think these Fort Totten guys came up with still another good idea.
Now is the time for all good men to come to the aid of the Spirit Lake fishing derby.

Grand Total Fuel Units (Gal., Qt., Etc.) 0.00 Note: (The grand total of fuel units is meaningful only if the report is limited to a single fuel type.)
Grand Total Fuel Cost: \$0.00
Grand Total Parts Cost: \$1,951.92
Grand Total Garage Labor Cost: \$16.69

Meet one of the partners of the North Dakota Local Technical Assistance Program



We, the County Engineers of the State of North Dakota, in order to be of greater and better service to our Counties, State and Nation and to promote the welfare of one another, do deem it advisable and necessary to unite ourselves into an organization for these purposes.

Concrete Pavement Restoration Reduces Costly Repairs

Concrete pavement restoration, or CPR, is a series of engineered techniques developed over the past 35 years to manage the rate of pavement deterioration. CPR is a non-overlay option used to repair isolated areas of distress in a concrete pavement without changing its grade. This preventive procedure restores the pavement to a condition close to original and reduces the need for major and more costly repairs later. In fact, recent reports from the Transportation Research Board state that for every dollar invested in appropriately timed preventive pavement maintenance, three to four dollars in future rehabilitation costs are saved.

Ideally, CPR is the first rehabilitation procedure applied to concrete pavement. It is usually applied early when the pavement is in reasonably good condition with only slight deterioration. CPR is typically used to replace isolated sections of deteriorated pavement, or to prevent or slow overall deterioration, as well as to reduce the impact loadings on the pavement. If the pavement needs more load carrying capacity or has deteriorated to poorer conditions, other procedures such as bonded concrete overlay, un-bonded concrete overlay, or reconstruction may be better alternatives.

CPR can be applied to a mildly deteriorated concrete pavement that already has an asphalt overlay. It is quite feasible to remove the existing asphalt, repair the underlying concrete using CPR, then open it to traffic without a new asphalt overlay. CPR does not necessarily increase structural capacity of a pavement,

but it does extend the pavement's service life.

Table 1 shows the available CPR techniques. Each technique is designed specifically to repair or prevent the recurrence of a certain distress or a combination of distresses. Although each technique can be used individually, typically they are more effective when several are used together.

Advantages

In the past, asphalt overlays often have been used on concrete pavements that have deteriorated. However, CPR has several advantages over asphalt overlays:

1. CPR addresses the cause of a pavement distress, minimizing further deterioration. Covering the distress with an asphalt overlay does not correct the cause of the distress. Eventually, the distress manifests itself again, usually as a larger, more expensive problem. This fundamental difference makes CPR more effective and less costly than asphalt overlays.
2. CPR is quicker and causes less traffic disruption. Because CPR maintains the existing grade, features such as curbs and gutters, bridge clearances, approach slabs, and roadside appurtenances do not need adjustment. Furthermore, CPR repairs only those areas that need improvement, such as the driving lane or the keel section of a runway. It does not have to be placed over the entire pavement width, as does an asphalt overlay. This accelerates the entire construction process, requires less traffic control measures, and causes less traffic disruption.
3. CPR preserves the safety of concrete pavements. Concrete does not rut, washboard, or shove. These defects can cause serious safety problems for asphalt pavements at intersections or

other locations, where traffic is starting, stopping, and turning. Further-more, because of their light color, concrete pavements reflect light better than asphalt pavements. This improves vision and makes driving safer at night and in inclement weather.


4. Studies have shown that the number of street lights can be reduced by one-third when streets have concrete surfaces. The light surface also keeps urban areas cool. Concrete pavements and trees can reduce temperatures by 10 degrees, which conserves energy in high-energy-use urban areas. Finally, the hard concrete surface makes vehicles more fuel efficient. 

TABLE 1: Available Concrete Pavement Restoration Techniques

Restoration Technique	Used to:
Full-Dept Repairs	Repair cracked slabs and joint deterioration
Partial-Depth Repairs	Repair joint and crack deterioration and surface distress
Diamond Grinding	Extend serviceability, improve ride and skit resistance, reduce noise
Dowel-Bar Retrofit	Restore load transfer at joints and cracks
Joint & Crack Resealing	Minimize infiltration of water and incompressible material into joint system
Slab Stabilization	Fill small voids underneath the concrete slab
Cross-Stitching	Repair low and medium severity longitudinal cracks
Grooving	Reduce wet weather accidents and prevent hydroplaning
Retrofitting Edge Drains	Add a longitudinal drainage system
Retrofitting Concrete Shoulder	Decrease pavement edge stresses & corner deflections

Adapted from **The Concrete Pavement Restoration Guide**, American Concrete Pavement Association, 1998.

Transportation Technology Transfer Center

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The Transportation Technology Transfer Program is a nationwide partnership under the Local Technical Assistance Program (LTAP) of the Federal Highway Administration, state departments of transportation, universities, and others. The program's purpose is to translate into understandable terms the latest transportation research and technologies. This information is made available to local officials transportation personnel in towns, cities, counties and townships.

Federal support for operation of the North Dakota TTT Center at North Dakota State University (NDSU) is matched by the North Dakota Department of Transportation, NDSU, the North Dakota Insurance Reserve Fund and the ND TTT Center. Guidance for the ND TTT Center is provided by an Advisory Board composed of members representing the federal, state, local and private sector transportation community. This newsletter is designed to keep you informed about new publications, videos, innovative technologies and training opportunities that will be helpful to you and your local unit of government.

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