

# The Center Line

Local Technical Assistance Program

A Service for Local Transportation Agencies

North Dakota Transportation Technology Transfer Center

North Dakota State University

## Annual County Road Advisors Conference 2005 "You Show Us" Contest - North Dakota Winner: Stark County

### COUNTY CONTACT:

Todd Miller, Equipment Operator  
Richardton, ND (701) 974-3668

### Modified Scarifier Bit System for Motor Grader

#### PROBLEM STATEMENT:

Maintaining gravel roads in a suitable condition and with as efficient a procedure as possible requires having the most suitable equipment as possible.

Rutting, washboarding and potholes occur frequently and it is necessary during routine maintenance of these roads to have procedures to remove these conditions as permanently as possible, with the least amount of time and effort.

#### SOLUTION:

Using the front mounted scarifier on the motor patrol, we attached two old cutting edges from a 627 scraper to the scarifier. The cutting edges were welded to the back side of the scarifier. The bit cutting edge was then mounted to the scarifier as shown in the photo. The cutting



Bit Cutting Edge

edge width is six feet. Whenever washboard and/or rough spots requiring additional work are encountered the bit scarifier can be used to loosen the materials and then use the moldboard on the motor patrol for the normal blading. The photos attached show the roadway before and after the blading operations. The operators say this works out very well and we have a set of these in each of our shops.

#### LABOR, MATERIALS AND COST

With the idea in mind it took approximately four hours to build the system. It was basically a matter of welding the plate to the scarifier and then attaching the bit cutting edge to the plate. The holes in the bit cutting edges lined up with the holes in

the welded plate. The necessary materials were all available as salvage within the shop. Nothing new was purchased.

#### SAVINGS AND BENEFITS

When encountering difficult roadway situations the bit system can be engaged to loosen the materials prior to the blading with moldboard, saving time in blading with perhaps only making one pass rather than several. A better job of blading is done and it may last longer. //

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Fall 2005

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#### Routing Slip

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

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Return to: \_\_\_\_\_



**Bit Washboard**



**Bit Improved**



**Bit Cutting Edge (close-up)**



Material loss from toe of moldboard.



The shoulder problem that develops over time.



The Gravel Saver disk in place on moldboard.

## **Regional and South Dakota State Winner**

### **Hand County**

**Contact:** Jeff Hargens

**Address:** Hand County Highway Department  
Miller, South Dakota

### **Gravel Saver**

#### **Problem Statement:**

It is so easy to lose material around the toe (or leading edge) of the moldboard when doing blade maintenance on gravel roads. This is a greater problem in dry conditions or when the gravel does not have sufficient fines to bind the stone and sand particles together. See Photos A & B which show how this happens. This is an exaggerated example which illustrates what normally happens over time. This loss of material eventually results in less gravel on the roadway surface where it belongs and begins to build a high shoulder which obstructs drainage.

#### **Solution:**

I became aware of a device that was being developed commercially to prevent this. It was a disk blade mounted on a bracket that attached to end of the moldboard and extended out to recover material. We tried it and it did not work well. However, the principle seemed logical and I began to experiment with a device of my own. I salvaged the bearing and housing bracket from a rolling coulter on an old farm plow and fabricated a device in our shop. After some experiments with different blades and different methods of mounting, the best solution was to mount a single disk blade on the coulter housing bracket and mount it directly to the grader's moldboard. This requires slight

modification of the moldboard, but does not affect the original strength of the grader's moldboard at all. The single disk blade turns as the grader moves forward and recovers and moves gravel back in front of the moldboard instead of letting it flow around the toe and spill to the shoulder. I have been using this device now for two years and it has performed with no problems. As with any change in a machine, you have to learn to operate with slightly different techniques. This device requires slight change in the pitch and angle of the moldboard to work well, but I have found it easy to use. See Photos C, D, E, & F which illustrate the mounting and field performance of the device.

**Cost of Labor and Material:**

I estimate the cost of my time in the shop at \$175.20, and the cost of two bolts, the salvage coulter and a very small amount of steel to fabricate the bracket at \$200.00. The total cost was \$375.20.

**Savings and Benefit:**

The primary savings is preventing gravel loss to the shoulder. This is a greater problem in extreme dry conditions which we have experienced in the last two years. The SDLTAP helped calculate gravel loss from the grader moldboard over a dry season at 2.75 lb per linear ft on both sides of the road. This number comes from some of their work in studying problems on gravel roads. This converts to 14.5 tons, or just over one tandem truck load of gravel, per mile each year. My current blade route is approximately 80 miles in length. Consequently, the savings in gravel loss alone is \$10,440 per year. This gravel can be recovered in aggressive shouldering operations on a gravel road in the spring, but this also costs extra money. The Gravel Saver disk really reduces the need for this. Another great benefit is eliminating a high shoulder which obstructs drainage and creates a safety problem when it gets severe. But, this is hard to convert to savings in dollars. //



Close-up view of the disk blade moving gravel.



Rear view showing clean recovery of gravel at shoulder.



The device has a simple two-bolt mount and is used on either side of the moldboard.

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## Colorado State Winner

**Sedgwick County**

**Contact:** Randy Renquist

**Address:** Road and Bridge Department  
Julesburg, Colorado 80737

**Concrete Plant**

**Problem Statement:**

Small communities across America are losing their local businesses. Over the past ten years, General Motors, John Deere, and local Supermarkets have all closed their doors in our area. Countless other businesses have closed as well. At this time, there isn't much we can buy locally. With the money in our community continually being sent to other communities, it has become increasingly difficult for our local government to function because there is no steady tax base.



Sedgwick County  
Concrete Truck Loading



Sedgwick County  
Concrete Plant Lab

### NOTICE

As the workshop coordinator of the North Dakota LTAP Center, I am working on updating our mailing address database.

If you would like to have all workshop flyers, newsletters, etc. mailed directly to you, please contact me by fax at (701) 231-5654, telephone, mail, or email

[donna.theusch@ndsu.edu](mailto:donna.theusch@ndsu.edu)

with the information.

Either a home or work address will be fine.

Also, I am working on setting up an email address database. With the email database I will be able to send out a workshop flyer reminder a week before the start of each workshop. Again, I will accept a home or work email address.

Thank you for your help.

Donna Theusch,  
Administrative Secretary

One example of this was our local concrete plant. It had been in business here for decades, supplying concrete to our County and local communities. About five years ago it was purchased by a large construction company headquartered overseas. After remaining in operation only a few more months, the plant closed. Ultimately, it became expensive and difficult to get concrete shipped to our County and local communities.

### Solution:

After the Economic Development agency was unable to find a buyer for the old plant, County Road & Bridge employees decided it would be possible to build and operate their own concrete plant.

### Labor, Equipment and Materials Used:

Locating a used concrete plant for sale was difficult, but parts were finally purchased and transported by County employees from a neighboring state. A plant was erected on County property by Road & Bridge staff. In addition, a 50 year old out building was used to serve as the concrete plant office.

After purchasing two 11-yard mixer trucks, we were producing concrete for the County and local communities in about 3 months. The concrete plant shares equipment and resources of the Road & Bridge department; including loaders, trucks to haul sand and gravel, labor, and office help.

### Cost:

- March 3 2004 bought 1970 ROSS 5yd portable concrete plant with 50 ton cement silo from neighboring state for \$30,000; and bought 2 USED 1987 Peterbilt trucks with 11 yard mixers for \$15,000 ea.
- March 11 & 12 went to neighboring state and brought back plant.
- March 15 started setting up plant with 3 Road & Bridge employees at a cost of \$6,000 in labor and \$10,000 in set up added equipment.
- April 8 2004 we sold our first load of concrete.
- Total cost of set up was \$76,000

### Benefits:

Concrete is the most used building material in the world. By offering concrete at a reasonable price, we are able to increase expansion of structures for businesses and homes in our County, which will ultimately help increase our community's tax base.

Having a government-owned local concrete plant in our County has benefited the residents as well as the Road & Bridge department, all of which are now able to acquire concrete locally in their own hometown.

In addition, the County Memorial Hospital has begun a big remodeling and expansion project, for which the County Concrete Plant has been able to save them thousands by supplying the concrete.

Savings to the County and community will be best realized in the coming years of production. Having governmental agencies providing unavailable goods and services could be the way smaller communities are able to survive in the future. //



## Fall 2005

by, Russ McDaniel, ND LTAP

### PAVEMENT MANAGEMENT SYSTEMS FOR LOCAL ROADS

How do we manage our pavement systems to determine our maintenance and construction needs over time? Some North Dakota counties have very limited “hard top” surfaces while others have considerable mileage with higher and heavier traffic volumes which will impact decisions being made concerning the upkeep of these roadways. Data collected for a pavement management system (PMS) is intended to provide assistance to the decision makers relative to the long term care of the roadway. There are various ways to do this from a simple windshield survey collecting limited data to a computerized system. This article is intended to identify North Dakota LTAP activities as well as those of Burleigh and Stutsman Counties.

There may be other North Dakota counties using formal pavement management procedures but Burleigh and Stutsman are the two we are aware of at this time.

In 1994 the North Dakota State University Local Technical Assistance Program (LTAP) Center developed a Roadway Inventory and Management Program in response to what we mistakenly thought was a demand for a process to assess rural roadway conditions,

particularly roadway pavements. It was a basic, easy to use, no frill program that even the most inexperienced user could master with a minimum of effort and training. It was intended to be a first step toward a more structured management process.

It included basic roadway information such as route I.D. and location, roadway geometrics, AADT, year sealed, year striped and right of way width in addition to a variety of surface distress items.

In 1998 we recreated the program as a windows application.

Neither of these versions gained the attention of potential users but with the advent of GPS capability, there now seems to be a renewed interest in pavement management.

Our third attempt at developing a pavement management program includes all of the items that were a part of the previous programs along with an additional process for linking the data to GPS procedures. It does not include suggested improvement types or improvement costs.

We have retained the three module concept, i.e. separate modules are included for flexible pavements, concrete pavements and gravel roadways.

In addition to GPS capabilities, we have added another totally new feature. It provides a method for calculating estimated roadway values on a per mile basis and for each roadway segment. Here is how the system works.

Users must provide the basic information needed to make these calculations for each module - we call these data items “Typical Section Values”. A data entry screen is provided to enter these

### FHWA Work Zone Rule Implementation Guide Available on the Website

The FHWA Office of Operations is publishing a Work Zone Rule Implementation Guide to help work zone practitioners implement the recently updated Rule on Work Zone Safety and Mobility. The Guide, titled “Implementing the Rule on Work Zone Safety and Mobility,” is available on the FHWA website at

[www.ops.fhwa.dot.gov/wz/resources/final\\_rule.htm](http://www.ops.fhwa.dot.gov/wz/resources/final_rule.htm).

This Guide is the first of four Rule implementation guides. The other three guides will cover work zone public information and outreach strategies, transportation management plans for work zones, and work zone impacts assessment.

The guides will be available by mid-November, 2005. The guides will be available in hardcopy and on CD-ROM by the end of 2005.

## COMING EVENTS

### NDTTTC Events

#### **Winter Road Maintenance**

November 1 , 2005  
Bottineau , ND  
November 2 , 2005  
Park River , ND

#### **Winter Survival for Road Department Personnel**

November 29 , 2005  
Rugby , ND  
November 30 , 2005  
Mandan , ND

#### **APWA Click, Listen & Learn**

<http://www.apwa.net/Education/CLL/>

#### **Strategic Communication**

November 17 , 2005

#### **Your Homeland Security Responsibilities: NIMS**

December 8 , 2005

values. Flexible pavement is used here to illustrate the procedure but the process is similar for concrete pavements and gravel roadways. Three items are needed. They are:

1. The surface width of a typical flexible pavement roadway in your county or the width you would like to upgrade your roadways to.
2. The depth of surfacing on a typical flexible pavement or the depth you would like to upgrade to.
3. The estimated per mile cost or value of a roadway that meets the criteria of items 1 and 2.

These three basic items along with an assessment of actual roadway conditions enable estimated per mile values for each roadway segment to be developed as follows.

The ((actual surface width divided by the typical section width) X (actual surface depth divided by the typical section depth) X (overall surface condition score divided by 100)) X the typical section per mile cost.

For example, let us assume the typical surface width is set at 24 feet, the typical surface depth is 4 inches and the value of the typical section is \$100,000 per mile.

Let us also assume the actual surface width is 22 feet – the actual surface depth is 3 inches and that the overall surface condition score is 80.

The formula for this example is ((22 divided by 24) X (3 divided by 4) X (80 divided by 100)) X \$100,000. The per mile value for this example roadway is \$55,000.

The cost per segment is simply the per mile cost X the segment length.

The operations manual has been rewritten that describes these procedures in greater detail. The new manual also includes greatly improved photos of the various types and levels of surface distress.

The program and manual are available for distribution by contacting Russ at the North Dakota LTAP Center's satellite office in Bismarck. Russ' phone number is 701-328-2658. His e-mail address is [rmcdanie@pioneer.state.nd.us](mailto:rmcdanie@pioneer.state.nd.us).

The Burleigh County assessment was conducted in 2004 and 2005. The final report was submitted to the county in February, 2005.

The method used to assess existing pavement conditions was a visual evaluation of surface cracks, rutting, bleeding etc. Pictures were taken at 60 locations and each is included in the final report. Each picture includes an I.D. number and these location numbers are referenced on a county map.

Details such as pavement width, section types, etc. were not a part of the study. Gravel roadways were excluded also.

The body of the report includes a discussion of the number of miles that are in various conditions. Conditions types include Good, Fair, Poor and Reconstruct.

It also includes an impressive tabulation of data and a large fold out map that provides a visual perspective of needs by location. It is not geared to make individual project selections. The tabular data includes fields displaying condition, location, jurisdiction, section length, improvement cost estimates, etc.

The report includes a variety of charts. They include the following:

- Road Inventory Comparison 2000 with 2004 showing the total road miles with a breakdown by county subdivisions, township subdivisions, county other roads and township other roads.
- County and Township Costs to Repair with a breakdown by county and township for roads in Fair, Poor and Reconstruct categories.
- County's Estimated Costs to Repair (Not including Seal Coats) with a breakdown by roads in Fair, Poor and Reconstruct categories.
- Township's Estimated Costs to Repair (Not including Seal Coats) with a breakdown by roads in Fair, Poor and Reconstruct categories.
- Estimated Costs to Complete All Needed Seal Coats by County and Township.

Jon Mill is the Burleigh County Engineer. He has indicated that he is pleased with the report, it adequately serves his needs, and that the cost to obtain the information was not excessive. He also indicated that it provides sufficient information, in a readily available format, that he can share with decision makers concerning overall roadway conditions. It also provides needed information to share with the County Commission and the public during discussions regarding proposed improvements and budgeting considerations.

For further information, contact Jon at the Burleigh County Highway Department - (701-221-6870).

Stutsman County is in the process of developing a pavement condition assessment tied to a GPS referencing procedure. They are using a program available through the Utah LTAP. It is still in the initial stages of development and implementation. //

### **Be Reasonable, DO IT MY WAY.**

by, David Grouchy

What do you think of people who disagree with you? Do you think they are disloyal, honest? How do you deal with them?

1. Constant Nay Sayers: These people don't care what you say. They are against it. If you agree with them, they will change their mind. Their concept of critical skills is to criticize everything you do. Sometimes, they will even tell you, but most of the time, they tell their co-workers that you don't know what you're talking about.
2. The Loyal Opposition: These people really do want things to improve. The way for that to happen is for you to be reasonable and do things their way.
3. Snipers: They never confront your decisions, but they criticize your actions, your dress, and your methods of speaking. They shoot at you from a distance and while your back is turned.

### **Handling these problems:**

1. Build Trust. The best teams may not agree with the one making the decisions, but will

work hard to make the boss's decision work.

2. Make sure you include everybody in decision-making, not just the people who agree with you.
3. Remind your employees that you are a team with a goal and that each member of the team is important.
4. Ask for feedback. "Is this a good idea? What do you think? You're going to have to live with it, so if you think I'm making a bad decision, tell me now."
5. Tell your employees and supervisors, "If you have criticism of my decisions, tell me and maybe we can find a solution. Talk to me, not about me. If I don't know the problem, how can I fix it?"
6. Explain to all your employees that an important part of your job is making decisions and that not everyone is going to like every decision.
7. Demand adult behavior. Treat your people with respect and demand respect and honesty in return.

As a supervisor, you will have to make some unpopular decisions. By using the techniques listed above, you will have more support from your employees, make better decisions and help everyone feel more like a member of the team. //

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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.

The use of product brand names in newsletter articles does not constitute any endorsement of those products by the ND TTT Center.

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## Reader's Response

Please help the Center Line become more effective by filling out this form and returning it to:

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*My address should be changed to:*

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*Please add this person to the mailing list:*

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Address \_\_\_\_\_

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*Please send information on:*

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*My idea, comment or suggestion is:*

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