

The Center Line

Local Technical Assistance Program
North Dakota Transportation Technology Transfer Center

A Service for Local Transportation Agencies
North Dakota State University

RODNEY NESS Receives “Excellence in County Government Award”

Rodney Ness, Burleigh County Road Superintendent, received the “Excellence in County Government” award at the annual Association of Counties convention in October. Rodney, along with six others, was

National Association of County Engineers annual conference to Bismarck in 2005. His innovative work developing relationships with townships and with other counties serves as a model for cooperative agreements throughout the state, from policy manuals to multi-county surplus equipment auctions. He serves on the NDACo Board of Directors, currently as 2nd Vice President.”



selected by their peers for this award. To quote from “County News” newspaper: “While managing one of the fastest growing transportation systems in the state, Rodney Ness finds time to maintain an active role in the state and national associations of county engineers. He led the 3 year effort to bring the

Rodney has been very active in the North Dakota Association of County Engineers, serving on the Executive Board for several years and as President of the association in 2003-2004. He is also a very strong supporter and participant of our Local Technical Assistance Program (LTAP). /

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In This Issue

Rodney Ness Award	1
“You Show Us” Contest: ND State Winner	2
Coming Events	3
“You Show Us” Contest: Regional & Other State Winning Entries	4
Computer Corner	10
Northland Chapter ATSSA “How To” Conf.	10
FHWA: Traffic Control Devices on Federal Aid and Other Streets and Highways; Standards Final Rule	11
Reader’s Response	12

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: _____



You Show Us 2006 North Dakota State Winner

Burleigh County

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Burleigh County Engineer
2000 N 52ND St.
Bismarck, ND 58501
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CHIP SEALING

PROBLEM STATEMENT

Chip sealing has always been a valuable maintenance and preservation operation performed on hot bituminous pavements. This is a fairly routine operation and is simply a layer of bitumen sprayed onto a roadway followed by a layer of cover coat aggregate usually consisting of a fairly open-graded, fractured rock material. Generally, the quantity of chip material applied is sufficient to cover the bitumen shot completely to prevent bleeding or tracking. If subsequent warm air temperatures or heavy traffic causes bleeding after application, a blotter sand material is spread to absorb or shield the bitumen material until it fully cures out.

The general practice has some undesirable effects. The worst being the presence of loose rock particles that readily become airborne by traffic which, in turn, can break vehicular wind shields and headlights. This excess amount of chip float, that never had a chance of being adhered to the roadway, also causes problems of disposal and actual waste of the chip product.

PROBLEM SOLUTION

For the last several years, Burleigh County has utilized application methods that greatly minimize these adverse effects of chip sealing. Chip seal work is not performed in-house. The plans call for usage of a

minimal amount of cover coat aggregate. The amount is minimal to the point that the loaded chip trucks following the chip spreader would leave bitumen tracks. The Burleigh County plan mandates sanding immediately and continuously right after the chip spreader passes, before rollers hit the fresh mat. This sanding is generally applied at the rate of 4 to 6 pounds per square yard, or adjusted to provide the necessary blotting function. The common "whirly bird" type sander works well to apply the necessary amount of sand in a uniform and non-wasteful manner. Multiple sanding units are required to keep up with the normal chip sealing marching speeds. The result is a "leaner", tighter, mat that is adequately blotted without the large amount of excess chip float common to most chip seals. Unfortunately, while the float amount is greatly reduced, there is still float to deal with. Burleigh County also mandates that float removal be performed in a timely manner, within 2 to 4 days of the application date.


COST SAVINGS AND SAFETY

Burleigh County has not spent a lot of effort attempting to document actual dollar cost savings resulting from this procedure. There is certainly a savings of cover coat material and a reduction in the likelihood of damage to vehicles caused by flying chip float. Consideration of general history shows that approximately 30 pounds of chips per square yard end up being an average project usage. With diligent and constant monitoring of the chip spreading operation, this usage average drops to approximately 25 pounds of chips per square yard. On a typical two lane, 24' pavement, the savings of 5 pounds per square yard extends to 35.2 ton of cover coat material per mile. The most current cover coat

bid price in Burleigh County has been \$43.50 per ton, furnished and applied. There is no benefit in purchasing an extra 35.2 ton of relatively expensive cover coat material to merely provide a blotting function. There is also a cost savings in the area of float removal. If the float is not there, it doesn't need to be removed or picked up.

There are a few other fairly unique items utilized in Burleigh County chip seal plans that have worked well for our purposes. A highly fractured aggregate is preferred, but usually a minimum of 50% single face fracture is specified. A larger particle size is also dictated on Burleigh County specifications.

While 100% of the cover coat must pass a 1/2" screen, a range of 10 to 30% of the material must be retained on the 3/8" screen. This larger particle size helps hold vehicle tires up, out of the bitumen and increases the roadway surface friction coefficient. Certainly excess chip float having these particle sizes would exacerbate the damage to passing vehicles, but the lean cover coat layer, immediate and continuous sanding, and prompt float removal have combined to almost completely eliminate any glass damage complaints. Also, safety to the traveling public, not having to drive on as much loose aggregate, is another benefit.

Immediate, mandatory sanding is a simple, minor concept but it has shown positive beneficial effects in Burleigh County, in terms of cost savings, resource savings, vehicular damage reductions, and final product mat quality. 

COMING EVENTS

NDLTAP Events

Gravel Road Maintenance

February 13, 2007
Dickinson , ND
February 14, 2007
Valley City , ND

Traffic Signing and Control

March 14, 2007
Bismarck , ND
March 15, 2007
Grand Forks , ND

Culvert Installation and Maintenance

April 4 , 2007
Oakes , ND
April 11 , 2007
Stanely , ND

Asphalt Pavement Repair

April 24 , 2007
Dickinson , ND
April 25 , 2007
Carrington , ND

APWA Click, Listen & Learn

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

Growing Your Tree Replacement Program

January 10, 2007

Traffic Calming Design Guidelines

February 15, 2007

OTHER EVENTS

ATSSA Northland Chapter "How-To" Training Conference

March 20-21, 2007
Fargo, ND

NACE Annual Conference 2007

April 22-26, 2007
Milwaukee, WI

You Show Us Contest 2006: Colorado State Winner

Phillips County Landfill 221 S. Interocean Holyoke, Co. 80734 (970) 854-2166

County name—Phillips County
Contact person—Matt Meusborn
Address—221 S. Interocean
Holyoke, Co. 80734
(970) 854-2166

Problem statement—In 2004 we upgraded from burning trash to our new bailing system. We needed an efficient way to haul our bails to the cell.

Discussion of solution—We discussed whether or not to use a truck with its own hydraulics or a trailer with a loader.

We decided on a trailer as it would be more efficient in our application. The loader hauls the trailer to the cell, dumps the trailer, unhooks and stacks the bails all in one trip. The operator never has to leave the cab. To make it most efficient we built two trailers, one is being filled while the other is being dumped. This way the bailer never has to shut down.

Labor—Two landfill employees

Equipment—Normal shop tools and welder



Phillips County Landfill 221 S. Interocean Holyoke, Co. 80734 (970) 854-2166

Materials used—We stripped down the old burner and used 65% of the metal to build the trailer frames (two trailers). We used two old truck axles for the main wheels. The only money spent was on the two small wheels and 35% of the metal was purchased.

Cost—In the two trailers was \$2000. in materials and about \$1800. in labor.

Savings and benefits—Materials, labor and engineering of the two trailers saved \$4000 per trailer.

By using the loader and trailers together we are saving more than 50% in haul time. We are saving in down time with the bailer. There is only one piece of equipment to maintain. Fuel cost is cut in half because trips are cut in half. Operation can be run efficiently with one person when necessary.





You Show Us 2006 Nebraska State Winner Scotts Bluff County

PROBLEM: With limited truck bed length, delivering material to a job site was always a challenge. Delivering corrugated metal pipes which can be damaged with too much unsupported length being transported was also an issue. A longer bed could have been a solution but a short bed in many instances is more manageable on a day to day basis.

SOLUTION: Truck with an extendable flat bed
Using existing flat bed, Scotts Bluff County built a retractable truck bed

extension that will allow an additional four feet of support for over length materials. When dumping materials the extension allows the material to be supported closer to the ground. The extension can then be slid back into the bed frame when not needed. Since the extension was built in the frame, the bed height was not altered.

LABOR AND MATERIALS: The extension was built in the County shop by Scotts Bluff County employees and took about fifty man hours to fabricate. Much of the material used was on hand.

The extension will provide an extra four feet of support for over length materials. The rails that ride inside the





existing frame is $\frac{1}{2}$ " x $4\frac{1}{2}$ " x 10' cold rolled steel. The rails are held in place in the frame as shown in the photos with $\frac{3}{16}$ " in the middle of the frame and $\frac{1}{2}$ " gussets at the rear end of the frame. The tubes in the center are $1\frac{1}{2}$ " o.d. square and 2" o.d. square mild steel. The function of the tubes are to help with the alignment and to provide a way to secure the extension in the open or closed position with the use of a $\frac{5}{16}$ " lynch pin. The end support was made of 3" x 6" x 6' heavy tubing. The end support sits on top of the rails to align with the bed of the truck. The end support has the ends closed with $\frac{3}{16}$ " steel and is attached to the rails with $\frac{3}{16}$ " gussets. A 1" diameter tube was welded between the rails to keep the rails from twisting in the open position. Additional pictures available.

BENEFITS:

Two bed lengths on one truck
When in use the extension will add four feet of additional bed length. Since the extension was built in the frame, the bed height was not altered. ▮

You Show Us 2006

South Dakota State Winner: Douglas County

Binder Application to Gravel

Contact: Mr. Travis Sparks,
Highway Superintendent
Douglas CO Hwy Dept
PO Box 508
Armour, SD 57313

Problem Statement:

Douglas County has a few sections of gravel roads that have traffic counts that meet or exceed the maximum for cost effective maintenance. However, the cost of putting asphalt surfacing on these sections is not affordable. We have begun to experience drought conditions intermittently since 2000. This has made gravel road maintenance very expensive. Frequent blade maintenance and replacement of lost aggregate was driving our costs up dramatically. We began to search for a solution we could afford. We will showcase one project we did on a six-mile section of Douglas Co Rd #540-5. This road has average daily traffic ranging from 343 at the intersection with US Hwy 281 down to approx. 100 at the opposite end. There is a rather high percentage of trucks on this section as well because of ag traffic and a gravel pit that is accessed from this road.

Solution:

We found that we had adequate thickness of gravel on the road. What was really causing the need for frequent maintenance was the excess amount of loose gravel on the surface. This was accumulating between the wheel paths and shifting to the shoulder. It was also causing more corrugation (or washboard) problems which brings many complaints. (See accompanying photos) We

determined that we really only needed to replace the fines portion of the aggregate which had dusted and eroded away from traffic, rainfall and wind. A suitable source of fine material which was primarily natural clay was located in our county. Very little sand or stone size particles exist in this material. Our LTAP center and our SDDOT central lab helped us with analysis of the material. Tests showed that it has a plasticity index of 12 which is the maximum allowed in SDDOT standard specifications for gravel surfacing.

We found only 200 tons per mile were needed to restore a binding characteristic to our existing gravel. We worked on the six-mile section beginning in June of 2002. We experienced some difficulty in handling the material due to its high plasticity, but it worked well. The binder material was hauled and placed directly on the existing surface gravel. Two motorgraders were used to equalize and mix the material before laying it back down on the roadway. On part of the project, we had two inches of rainfall immediately following the laydown. That was a problem, but it dried out in two days after reworking the material with motorgraders and wheel packing with trucks. In the end, this section actually performed somewhat better than the rest. The entire project has performed very well.

Cost Savings/Safety Benefit:

This project has not only saved us a lot of money, it has improved roadway safety as well because of much less loose aggregate being on the surface. Our cost data is as follows:

• Labor	\$ 2,534.00
• Equipment	4,150.00
• Material	5,031.00
Total Cost	\$11,715.00



Conditions typical of Douglas CO Rd #540-5 before binder application.



Taking a sample of the binder material from a stockpile.



Outstanding performance of Douglas CO Rd #540-5 late in 2005 after a period of 41 days with no precipitation. Blade maintenance had been performed once during that period.





The real goal was to not haul a large volume of material on a road that already had adequate thickness of gravel, but to simply haul enough binding fines to restore a bound roadway surface.

The biggest initial savings was on material because we would normally haul 1000 tons per mile when regravelling. On this job, we hauled only 200 tons of natural binder material per mile. The road actually went into a better bound state than it would by adding fresh gravel. We saved approximately \$20,000 on material.

Because the gravel went back into a bound state once again, we estimate blade maintenance was reduced by half through the rest of '02, and in '03, '04 and '05. This is best illustrated by the fact we did blade maintenance only once during a sixty day period in '05 with virtually no rain. A local farmer who lives along the road reported absolutely no measurable precipitation for 41 days during this time. Ordinarily, blade maintenance every two weeks would barely keep the road in shape! Our cost for motorgrader operation back in 2002 was \$43.16 per hour. While it is hard to accurately predict how often blade maintenance would be done during the maintenance season, it is safe to

say we saved \$775 per year on blading. Using our own estimate of hours of reduced motorgrader time in blading as well as material, here is our total savings on the project over four years:

• Material saved	\$20,064.00
• Reduced blading	4,650.00
Total savings	\$24,714.00

It is extremely hard to estimate the savings of safety enhancement due to the reduced loose aggregate and corrugation on the road. It was definitely a safer road to drive on. (See accompanying photos)

We have noted that the binder material has once again gradually blown and eroded away and we were forced to resume blade maintenance on average of every two weeks again during the past season which was once again very, very dry. However, this was a good project since we normally would have to regravell this road in four years anyway. ▮

You Show Us 2006

Wyoming State Winner: Goshen County

Auto Gate Cattle guard Bases

Problem Statement: The Goshen County Road and Bridge Department needed an affordable solution for their cattleguard bases.

Solution: They constructed forms to pour concrete base structures for cattle guards.

Labor: 90 man-hours

Materials:

- 190 sf 3/4" plywood
- 128 ft 2" x 10" lumber
- 64 ft 2" x 4" lumber
- 128 ft 2" x 6" lumber
- 200 ft 1/2" x 1/2" angle iron
- 96 ft 36" valley tin

Materials (continued):

- 32 ft 1/4" x 12" sheet metal
- 5 lbs deck screws

Cost: less than \$800 for forms

Savings/Benefits: The Department will save \$60,000 annually and can place these forms using the Department's own equipment.

Description

Goshen County has constructed forms that allow them to build cattle guard bases to their specifications. The bases are 12' or 16' long. Two 12' bases can be put together to make a 24' base. The width can be adjusted, but is typically 6' or 7'.

The inside of the forms is lined with tin and oiled before placing the concrete. The concrete is reinforced with rebar. Rebar handles are placed so the bases can be lifted out of the forms. A handle used when placing the bases was made by placing a piece of PVC pipe in the bases so they can be lifted with a loader. Spacers are used to produce bases of various lengths. Straps prevent the forms from spreading during concrete placement.



Building cattle guard base forms.



Forms with straps, keys, and PVC pipe to create handles.



End and side bases with handles.



Gary Korell describing the installation of the bases.

The Northland Chapter of the American Traffic Safety Services Association (NCATSSA) will again be holding a "How-To" training conference March 20-21, 2007. The "How To" training conference will hold it's 15th annual event at the Fargo Ramada Plaza Suites & Conference Center. The "How To" is open to city, county, state and federal agencies as well as consulting engineers and contractors.

Tentative workshops led by state, federal, and local industry professionals include these topics:

- Work Zone training
- Cold weather pavement marking in ND, SD, MN
- Safety & Mobility in Work Zones
- Sign Installation Trng
- Crash Testing & NCHRP 350 – ND, SD, MN
- Wet Reflective Pavement Markings – ND, SD, MN
- Gravel Road Mctc
- Rural Road Safety
- Safe Routes to School
- Sign Inventory Mngmt
- Open Forum for Government Officials
- Weight Limit Training
- Other Topics
- The exhibit hall will feature 45+ displays.

Mark your calendars now. Advance registration will be mailed in November or can be made by visiting www.atssa.com.

Contact: Ken Russell
3D Specialties, Inc.
701-293-8599
ken@dakotafence.com

COMPUTER CORNER



FALL 2006

by, **Russ McDaniel, ND LTAP**

Today is an anniversary, of sorts, for me. It was 15 years ago that I submitted a letter of intent to retire from the North Dakota State Department of Transportation. The effective date was December 31, 1991 and I started work for the North Dakota Technology Transfer (T2) Center soon after that time.

The T2 Center's name has since been changed to the Local Technical Assistance Program (LTAP) Center but the mission remained unchanged. A mission statement is included in each issue of our Center Line and reads: "The program's purpose is to translate into understandable terms the latest transportation research and technologies". The information is made available to local official transportation personnel in towns, cities, counties and townships.

I like to think that, during these past 15 years, I have contributed to that effort.

Now, my family ask when I plan to retire from LTAP. I tell them it will happen when my health will no longer permit me to continue, when Dr. Andersen decides it is time, or when I find something I would rather do. I don't expect to find something I would rather do.

¹⁰ My focus has been, almost exclusively, with computer

technology. Because our MDMS program is the one most widely used, I will use it to reminisce regarding how our programs have evolved.

We started with the original version of the Microcomputer Data Management System (MDMS) program that was developed by graduate students at Auburn University. At about that same time, Cass County offered their program for highway sign inventory and management to us with the understanding that we would make it available to other county, city and township users.

Barnes and Traill County were pioneers as users of the MDMS program. Charlene Windish, in Barnes County, and John Wright, in Traill County, enjoyed widespread respect, at that time, as office managers in their respective highway departments. When word spread that both Charlene and John endorsed MDMS, the number of users grew rapidly.

However, the need to update MDMS soon became apparent. As the number of users grew, so did suggestions for program improvement and revision. It was in response to these user suggestions that we developed our own versions of the MDMS program. Because we continued to receive suggestions for program improvements, we continued to develop additional updates. Our first MDMS program update was version 4.0 followed by versions 5.0, 6.0, 7.0, 7.1 and version 7.1 second edition.

In North Dakota, MDMS is used in 17 counties, two cities and four Bureau of Indian Affairs road departments.

The Bureau of Indian Affairs (BIA) area road Engineer in Aberdeen South Dakota issued a directive

that all road departments under his jurisdiction use the MDMS program for their record keeping and reporting procedures. At his request and on two separate occasions, I conducted MDMS workshops in Aberdeen for BIA employees. Montana has the most out-of-state MDMS program users. I know of 27 but I know too that the Montana LTAP center has made distribution of the program without our knowledge. I learn of new users only if they call with a problem or question.

We have made the program available to a number of LTAP centers in other states but we have no way of knowing the number of individual users. These states include: Idaho, Kansas, Kentucky, Maine, Nebraska, South Dakota, Vermont and Wyoming.

MDMS is not our only program. We have a Highway Sign Inventory and Management program. This evolved from the initial Cass County effort in much the same manner as the MDMS program.

In addition we have developed a Pavement Management program and a Minor Structure, Culvert and Cattle Guard program. Both of these programs include three separate modules. Users can use any one or all three modules.

The Pavement Management program includes a module for flexible pavement, another of concrete pavement and a third for gravel roadways.

The Minor Structure, Culvert and Cattle Guard program includes a module for each of these structure types.

We have developed a few specialty programs at the request of County

Highway Agencies. They include a Shop Management program for the Burleigh County Highway Department, an Accounts Payable program for Traill County and a Work Order Management program for Richland County.

I want to express a special thanks to all of the county, city, township and B.I.A. personnel that contributed to the success of our computer technology effort - I wish I could name each of you individually. Working with you has been great! I can safely say that each and every program improvement that we have made, originated with one or more of our clients and we, the LTAP Center, thank you for that contribution.

Last but not least, I want to thank Dr. Donald Andersen for the opportunity to be a part of his LTAP center team and for making these 15 years the most enjoyable of my life. I can't describe his management style but I can tell you that it worked for me.

THANK YOU Dr. Don! 

Traffic Control Devices on Federal-Aid and Other Streets and Highways; Standards-Final Rule

The FHWA is revising its regulation that prescribes procedures for obtaining basic uniformity of traffic control devices on Federal-aid and other streets and highways. This final rule makes some nomenclature changes, removes outdated references, and provides clarification on the meaning of roads "open to public travel" and "substantial conformance." The effective date is January 16, 2007.

Full notice:

<http://a257.g.akamaitech.net/7/257/2422/01jan20061800/edocket.access.gpo.gov/2006/pdf/E6-21228.pdf>

For Further information contact: Mr. Hari Kalla, Office of Transportation Operations, (202) 366-5915, or Mr. Raymond Cuprill, Office of the Chief Counsel, (202) 366-0791, U.S.

Department of Transportation, Federal Highway Administration, 400 Seventh Street, SW., Washington, DC 20590. Office hours are from 7:45 a.m. to 4:15 p.m. e.t., Monday through Friday, except Federal holidays.

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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

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