Dedication of U.S. 50 Section of Road from Bedford to Brownstown named "Russell ‘Bob’ Harrell Memorial Highway"

Mr. Harrell is pictured next to the sign that commemorates a lifetime of dedication to improving Indiana roadways. On Wednesday, June 13, at the Jackson County Courthouse in Brownstown, a ceremony took place to dedicate a portion of U.S. 50 to Russell “Bob” Harrell, a longtime Indiana Department of Transportation employee.

Senator Brent Steele, District 44 authored Senate Concurrent Resolution 44 this past session to rename the road in Harrell’s honor. Harrell began working for the Highway Department in 1924, carrying water and breaking rock, and had almost 75 years of active experience in highway and bridge engineering. Mr. Harrell was twice a district engineer of the Seymour District of the State Highway Department. He later served as assistant superintendent of maintenance, assistant chief engineer of operations, and eventually director of the Indiana State Highway Department. “Bob Harrell spent a lifetime improving roadways and travel for Hoosiers,” said Senator Steele.

Harrell was one of the central figures behind our state’s interstate system becoming a reality—an interstate system that makes us the “Crossroads of America” today. He was also project engineer for the construction of U.S. 50 between Seymour and Brownstown. He was twice honored as a Sagamore of the Wabash as well as a Distinguished Hoosier by Indiana governors.

“When we were discussing how to honor Mr. Harrell, naming this portion of road made perfect sense,” said Steele. “It is near his home of more than 50 years and he was the engineer of its original construction.”

At the dedication ceremony, June 13th was officially named “Bob Harrell Day”.

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Indiana LTAP

Indiana Local Technical Assistance Program (LTAP) was established by the Federal Highway Administration (FHWA). The purpose of the LTAP program is to translate the latest, state-of-the-art road, highway and bridge technologies into systems usable by local highway agencies. LTAP is funded by FHWA, the local agency distribution of the Motor Vehicle Highway Account and Purdue University.

The Pothole Gazette is published quarterly by the Indiana LTAP office at Purdue University. It is distributed free to county, city or town road and street personnel, and others with transportation responsibilities.

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Indiana LTAP
Training Calendar
2007—2008

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Road Scholar Core Course #10
Drainage
August 22
Indiana Street Commissioners Association Annual Conference
Holiday Inn Lakeview
Clarksville, IN

Transportation Expo and Snow Plow Rodeo
September 19-20

Road Scholar Core Course #1
Powers and Duties
September 19
Indiana State Fairgrounds

Concrete Pavement Workshop
November 8
University Inn
West Lafayette, IN

Road Scholar Core Course #9
Bridge Basics
November 28
Indiana Association of County Commissioners Annual Conference
Sheraton Hotel and Suites
Indianapolis, IN

2008 County Bridge Conference
January 23-24
University Inn
West Lafayette, IN

2008 Stormwater Drainage Conference
February 27
University Inn
West Lafayette, IN

2008 Road School
March 25-27
Purdue University
West Lafayette, IN

◆
The Road to Safety
Part II: How Do We Identify Locations to Improve?

Rick O. Drumm, P.E., Federal Highway Administration – Indiana Division
Laurie D. Johnson, P.E., DLZ Indiana LLC

Introduction

One of the authors of these articles is frequently quoted around the country as saying, “Safety is a good thing.” The fact is, though, nobody is ever “against” safety. A presidential candidate would no more likely say that he or she is against babies or puppies than say that he or she is against safety. But not saying you are against something is a far cry from putting your beliefs into action and improving safety on our road system. In this series of articles, we want to encourage all of us to take action, to improve safety on the roads within our jurisdiction. We also want to provide you with some ideas on how to do that.

Last time, we talked about the reason for our safety efforts. This emphasis is more than justified, even demanded, by the fact that highway fatalities are the number eight cause of death overall, and the number one cause of death for all people in age categories from 4 to 34. We also discussed what our first step should be: know your safety numbers. You should now have in front of you a table of how many crashes, injuries, and fatalities occurred on your roadway system in the past few years.

In this issue, we want to dig deeper and move from knowing overall numbers, to knowing where the crashes occur. We especially want to know the locations of where a disproportionate number occur. This is a complex question, and below, we will give you a few ideas of how to approach it.

The goal, or end result of this episode in our Road to Safety is for you to have a list of sites in your jurisdiction that would be considered good candidates for further investigation for safety improvements. These locations, if improved, would yield a better payback to the public in terms of less crashes, injuries and fatalities.

Data Sources for Identifying Locations: Crash Data

Being on the technical side of life, people that oversee highways typically like to approach an issue like location identification the way Sergeant Joe Friday would, “Just the facts, Ma’am.” We want data. Cold, hard, solid data. We will discuss the pure data side of highway safety, but we will also discuss the less fact-based analysis, like asking others for their opinion. Don’t worry; there are no group hugs in the assignment. Those are optional. But we will first start with crash data.

Crash data, as stated in the previous article, is collected and stored by the Indiana State Police in a system called ARIES. Access to the entire database is not typically available to local highway agencies, but in reality you only need the information for your roads. There are a few different methods to get the database file (typically in Microsoft Access) you need. Your first option is to ask your local police (Sheriff, Chief, local State Post) for help. They can request a query for all roads in your jurisdiction for three years, say 2004, 2005, and 2006. Using three years of data is important to help negate any statistical variations that do occur every year.

Getting complete and accurate data is sometimes tricky, due to the way the information is complied in ARIES. Therefore our suggestion is to cast a bigger net, then when you get the data in database form, then you can review it and decide which crashes are really on your road network. We know you’re asking, “What does this mean?” Well for example, if you request crash data for only roads coded as “county” jurisdiction, you may be leaving out a large number of crashes that may have been classified “local” or “unknown” but actually occurred on a county road. Therefore, ask for all the crashes in the county regardless of road classification and review the database query, on your own, to assure yourself that you have all the crashes in your jurisdiction.

In the event that you cannot get the crash data from your local law enforcement agency, you can ask for the data from the State Police, Records Division, who will refer you to their contractor who runs the crash data system. Another way, which is planned to be available this fall, is to request data from the LTAP HELPERS program manager. When the vacant position is filled, their job will be to assist local agencies with safety data, analysis, and various other safety initiatives.
I’m sure you all remember that famous chorus from the song recorded by Tesla, or The Five Man Electrical Band. Who would think that a rock and roll song would so perfectly describe the conundrum highway engineers and road and street supervisors face each day when they drive by traffic signs?

In reality traffic signs and other traffic control devices (TCD) are critical elements to the safety and mobility of the entire road network. According to various research, properly placed traffic signs can reduce all crashes by 20-40%. Wow, what a difference an inexpensive sign can make to improve the safety of our roadways! TCD are so important that the Manual on Uniform Traffic Control Devices (MUTCD) sets the national standard and is the law governing all TCD on all public agency roadways. So as we focus on sign improvements, the MUTCD will be our guiding document.

**Data Sources for Identifying Locations: Personal Input**

Although it is highly preferred to emphasize the cold, hard crash data, a road supervisor or highway engineer may want to use a more informal, less concrete method to supplement the possible locations for safety improvements. In the event that crash data is difficult or impossible to collect or analyze, asking personal input could replace the lack of “solid data.” As for personal input, there are a number of sources.

You may wish to ask for input from people who know where crashes occur because they show up shortly afterwards. Police respond to crashes. So do Emergency Medical Technicians (EMTs).

Both groups may give valuable information that for one reason or another does not show up in a crash data analysis. Ask the police chief or sheriff if you can send an e-mail to the officers asking for their input. Do the same with EMTs. These emergency personnel are the ones who are responding to the calls and will likely have a good idea of which intersections or road segments are the more frequent sites to which they race in responding to a call. If more than a couple of these people identify a particular location, put that on your list.

Maintenance personnel may also have a good sense of locations of safety interest. They are the people that have to repair guardrail that has been hit, replace signs that have been knocked down, or regrade roadsides that have tire or skid marks. They know the road system quite well and can help identify locations that they, like the emergency responders, have to visit frequently.

The public is another source of input. It is not a secret that many on the hardware side of road oversight often see the public as an inconvenience, even though they are the ones we are serving. Wouldn’t we rather have our “customers” remain silent customers? That, however, is a debate for another time. For now, let’s say that although some of the public may not have a good handle on the technical aspects of our work, getting a few calls from different people about how this or that road section is “dangerous” can be valuable information. These people are also out on the roads every day, driving on familiar highways, and acquainted with intersections and curves. When they are driven (no pun intended) to call or e-mail with a concern about a particular road location, we should listen. Recent research at Purdue showed that if just two people called in to a public agency about the same location, there is about a 50% chance of that location being a high crash location. If three people contact the agency, it is closer to 75%. That means that as you keep track of the calls, letters or e-mails, if any location starts to receive more than its share of “fan mail,” put that one on your list.

**How to Derive a List of Potential Locations**

Before we discuss how data can be analyzed, let us first decide what we are looking for, or rather, what is the name of what we are looking for. We know we want a list of sites or segments on which we want to focus our safety attention. In literature and in use in various places around the country, these are called a wide variety of names: High Crash Locations (HCLs), High Accident Locations (HALs), Sites with Promise, Sites of Safety Concern, Black Spots, Potentially Hazardous Sites, and on and on and on.

For lack of a way to build consensus here, we will call these places we are identifying – Locations of Safety Interest.

Using the possible data sources discussed, you have a choice of approaches. As always, there are advantages and disadvantages to the various methods. As long as you stick to a reasonable method, you will develop a list of good candidate locations. In other words, using a method where a monkey throws darts at a map will not work.

As will be seen, there are a number of different legitimate methods that can be used to derive a list of sites that we would want to investigate further. In the next issue, we will discuss what improvements can make these locations safer. For now though, we still need to do a little research and data analysis.

Three categories of data analysis are typically used, each with possible variations. They are briefly described below:
Now let’s break down our theme song a little more:

“Signs, signs everywhere a sign
Blockin’ up the scenery, breakin’ my mind”

In other words, information overload! Too many signs actually prove to be a distraction. As seen in the photos, one of the non-conforming issues is that multiple signs, conveying different messages, are installed on one post. MUTCD (2A-16) tells us that the only signs that should be posted with stops signs are supplemental plaques and street name signs. How do you improve these locations? Since regulatory signs should be given the highest priority, the stop signs and one-way sign should be placed in the appropriate locations with supplemental plaque(s) as required. The warning signs should be relocated to a separate post in a manner that doesn’t block the view of the stop sign. The necessity of other signs should be considered and then relocated to a more appropriate location. Remember signs should be used conservatively because excessive use reduces their effectiveness.

- Crash Frequency – Simply comparing the number of crashes
- Crash Rate – Comparing the number of crashes divided by the exposure to risk (traffic volume in most cases) at each location
- Statistical Variation - Comparing the number of crashes at a location with how many crashes are expected for that type of roadway or intersection, calculating a standard deviation for that location, and comparing crashes experienced versus crashes expected.

Statistical analysis is the most complete approach and is where the safety community is trending. However, just seeing the glaze in peoples’ eyes when you mention things like standard deviation, reminds us that this method is one that would be used by high end users like researchers that have more computer training, time, personnel, etc. than is typical in a local highway agency. Using rate is a good option, especially if breaking the roads down into classifications. The important point to remember is to use a sensible method to identify Locations of Safety Interest.

You may want to consider crash severity as you develop your procedure. In any of the methods noted, you can also break down the crashes into severity. Since fatal crashes may be relatively rare, we typically combine those with injury crashes. If you are looking at rate, you need to have good estimates on traffic volume, a data point you may not have for all your roads. So, instead, you may look at frequency on different classifications of roads, or frequency per mile.

To sum up, you have many options. You may want to look at the number, or frequency, of all crashes on all your roads. You may want to look at all fatalities/injuries on your different road types – local, collectors, arterials. You may consider the rate of crashes at intersections by crashes per million entering vehicles (MEV), or rate on segments of roads by crashes per 100 million vehicle miles (MVM) traveled. Whatever the method, choose one and work with it.

The goal is to end up with a listing of intersections and/or road segments with the frequency or rates of crashes. These could be listed in table form or be displayed on a map to help visually see the locations of the sites and possible concentrations.

One question may come to mind – How do we crunch the numbers and display the results? Again, there are many options. You could contract out the work. Or, using the trend of our society, and knowing that younger people are generally more tech-savvy, you may want to hire a part-time student that could compile this data into a table or map. What an opportunity for a younger person to make an impact on highway safety by using his or her expert computer skills (beats saving the world from alien invasion, since we suspect most of those computer skills are really just games).
“Do this, don’t do that, can’t you read the sign?”

Exactly! Signs are supposed to convey a simple message and fulfill a specific need. Unfortunately, all across Indiana these important messages aren’t being conveyed simply because you can’t read the sign. You will see some examples below, and if you can believe it all photos were taken on Indiana roadways.

Probably the first and most obvious reason signs can’t be read is that the sign face is damaged. As can be see in the following photos, these signs are no longer able to convey an effective message. They are barely legible in daylight. How can they be effective in darkness when a driver would most rely on warning or regulatory signs?

Placement and visibility of TCD are vital to their effectiveness. If a sign can’t be seen, appropriate driver behavior cannot be expected. The following photos show how vegetation or existing terrain affects sign recognition. On-street parking, piled snow and crops are also common culprits that restrict sign visibility.

Whether you realize it or not, we depend on a sign’s distinctive shape and color to warn us of changes or hazards in the road. Therefore it is important to ensure that highway signs follow MUTCD (Chapter 2A) guidelines especially for shape and color. For example, the following shows a couple of signs that appear to have a white regulatory background rather than the required yellow warning background.
Assignment

So, now it is time for your assignment. This will take more time than the previous one, and it is likely the most difficult assignment you will receive. Develop a list of your top Locations of Safety Interest using the following steps:

- Get the crash data, either through the State Police or your local police agency.
- Determine a method you wish to use, frequency or rate as described above. Input the crash data received in the chart below.
- If you decide to determine crash rate, input traffic volumes, either AADT for road segments or total entering vehicle for intersections.
- If you’re feeling adventurous, start an EXCEL spreadsheet with the information.
- Identify a target number, probably between 5 and 20, locations that you consider to be of high interest.
- While you are having the data analyzed, talk to the police, EMTs, and maintenance folks, and review citizen complaints. From those discussions, you compare the information to your list below. Add a location or two to your list, if appropriate.

Get ready for Issue III, prioritizing and analyzing locations.

In the end, what we want is a list. Use a methodology that fits your situation and approach, and go to it!

Conclusion

Locations of Safety Interest

<table>
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<th>Location</th>
<th>Total Crashes 2004-2006</th>
<th>Fatalities or Injuries 2004-2006</th>
<th>AADT (segment) for MEV (int.)</th>
<th>Personal Input</th>
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Mark Twain once said, “Everybody talks about the weather, but nobody does anything about it.” We do not want that quote to describe highway safety. It is easy to talk about it, to be against it, to state that, “Safety is a good thing.” But let’s not give people credence to state, “Everybody talks about highway safety, but nobody does anything about it.”

Let’s again ask ourselves how to improve signs than are not readable, can’t be seen or are the wrong shape or color? Well in most cases new signs are required. Ouch! Replacing all of your sub-standard signs could really put a hurt on your budget. So be practical and start small. Set aside a portion of your budget and begin in one township or smaller area of your city or town. You may even decide to first concentrate on only stop signs. As further enticement, take some “before” and “after” pictures of your handy work and e-mail them to us (Rick.Drumm@fhwa.dot.gov or ljohnson@dizcorp.com). We will be happy to give you some free publicity and show them in a future article. As we have stated, “Safety is a good thing.” Now let’s do something about it.

Implementing a roadway quality management program will help to ensure that municipalities are building and maintaining high quality roadways. This series of articles will discuss the key components of a quality management program that include pavement construction standards, utility control policies, contracts and specifications, and construction inspection. Part 1 will discuss the importance of implementing a comprehensive roadway quality management program, as well as, the need for adequate pavement construction standards.

In order to properly maintain any roadway system, all required maintenance and rehabilitation or other activities such as utility work in the roadway must be properly constructed. Additionally, new roads must be required to meet reasonable high quality standards. A poorly built road can deteriorate quickly and thereby become a “money pit” that will drain the municipality of precious funds for many years to come. Since the cost of these additional maintenance problems must be added to an already strained maintenance budget, the results could be financially devastating. Therefore, any successful roadway preservation program must include a comprehensive quality management program to ensure that all new roads, as well as, preventive maintenance and rehabilitation projects, are properly constructed.

The importance of a comprehensive quality management program cannot be overstated. We do not live in a perfect world, mistakes do happen and errors are made, even by the best contractors. The occurrence of mistakes can be amplified by the “low-bid” system utilized by government agencies to award construction contracts. There is a “fair market value” for the cost to construct a project. When forced to bid in a “low-bid” environment, there is a tendency for contractors to take short cuts to create a competitive advantage. Unfortunately, short cuts do occur in construction way too often. This “short-cut” phenomenon is similar to drivers speeding when there is no one enforcing the speed limit. There must be a safety net to protect the taxpayers. Proper contract documents coupled with a good inspection control program will help to ensure that the taxpayers receive a dollar’s work of goods and services for each dollar spent.

A comprehensive quality management program should include the following elements:

- Contracts and Specifications
- Inspection Program
- New Pavement Construction Standards
- Utility Control Ordinance

Agencies may have implemented pavement management systems that allow them to maximize taxpayers’ investment in the maintenance, repair and rehabilitation of existing road surfaces. However, in order to cost-effectively manage a roadway system, stringent requirements must be in place to ensure that new roads, usually in subdivisions, are properly designed and constructed. Otherwise, it becomes a case of the “money pit syndrome.” As stated above, good money spent to fix poorly designed and/or constructed roads is a waste of taxpayers’ money. For example, initially the pavement may be structurally inadequate to begin with. Then, once the failures occur, rather than properly repairing the root cause of the problem, many agencies will compound the problem by spending as little money as possible to “cover up” the problems. As shown in the picture to the right, failure to fix the underlying problems will require additional repairs sooner rather than later.

Unfortunately, many local agencies have adopted “minimum” construction standards for subdivision streets that are generic in nature. Many times the “minimum” stan-
dards are inadequate, resulting in streets which only last for a few years before major maintenance or rehabilitation is required. Minimum road construction standards typically result in poor performance due to several technical deficiencies in the design of the pavement thickness such as:

1. **Traffic Loads.** A common practice for determining the structural capacity of a pavement is to base it on a certain number of vehicle trips per dwelling unit per day, using only car traffic or a minimal amount of heavier vehicles. This method usually fails to properly account for heavy traffic using local roadways. Heavy vehicles produce much more damage than do automobiles. For example, a fully loaded tractor-trailer will cause thousands of times more damage than a car. Therefore, failing to account for heavy truck traffic can result in the design of structurally inadequate pavements.

A typical subdivision street may be exposed to different types of heavy vehicles including: school buses in the morning and afternoon; if private trash haulers are used—several trash collection trucks from different companies may drive down a street on a single day; building supply delivery trucks—especially during the construction phase (many times significant base material damage is done, but the damage is never properly corrected); and large moving vans. If the street serves as a short cut to places such as a school or industrial park, these numbers may go up significantly.

For subdivision streets, accounting for damage caused by construction vehicles is crucial. Many times, a majority of the truck traffic that a pavement will experience during its initial design life occurs in the construction phase prior to placement of the final wearing course. This can accelerate the deterioration because the pavement is not at full strength. Although most agencies will require the “worst” areas to be patched, the remaining portion of the pavement may have lost a significant portion of its remaining life. This can result in early failure of the pavement which now becomes a financial burden for the taxpayers. In the photo below, anything short of complete removal of the asphalt layer in this street will ensure a quick failure of the final wearing course.

2. **Soil Conditions.** Soil conditions can vary greatly from one end of a municipality to the other, as well as, from one end of a street to the other. Since the load carrying (support) capability and moisture susceptibility of the soil can greatly affect the long term performance of the pavement, the variability of soil types and characteristics must be addressed. Minimum subgrade characteristics and soil testing requirements should be specified in the design requirements. Also, specifications must adequately address how to deal with unexpected soil conditions. In the photos below, a six-month old pavement failed because the soft/wet subgrade problem was not properly addressed.

3. **Drainage.** Proper drainage is essential to the long-term performance of any pavement. Even when the best materials and construction practices are used in building or maintaining a road, if the drainage is poor, the life of the pavement will be much less than expected. Excessive moisture in the granular courses and the subgrade beneath the pavement surface causes damage in several ways, including:

**Weakening of the Support Layers.** Moisture in the soil reduces the internal friction between soil particles which lowers the shear strength of the soil. If the soil moisture is high, especially for long periods of time, the pavement could be severely damaged.

Pavements rely on the lower layers to provide a stable, uniform support for the surface layers. When the lower layers are weak-
Indiana’s New Work Zone Law: What You Need to Know

By Megan Tsai, INDOT Office of Communications

On July 1, 2007 a tough new work zone law went into effect in Indiana. For drivers, the new law means stiff penalties for speeding and driving recklessly in work zones. For highway workers and Hoosier motorists, it means safer driving on Indiana roadways. And for local public agencies, utilities and developers, it means posting new required signage in advance of all work zones on public roadways.

What is the new work zone law?

Indiana’s new work zone law sends a clear message to those who make the risky decision to speed and drive recklessly through Indiana’s highway work zones – that this behavior puts the lives of other motorists and Indiana highway workers at risk, and will not be tolerated. The new work zone penalties were established by this year’s General Assembly in House Bill 1623 and signed into law by Governor Mitch Daniels on May 22, 2007.

The law sets the minimum fine for speeding in a work zone at $300. Additional penalties within a three-year period are $500 for a second offense and $1,000 for a third offense. Under the new law, motorists who injure or kill a highway worker face fines as high as $10,000 and up to eight years in prison. The fines collected under the provisions of the new law will be used by the Indiana Department of Transportation (INDOT) to fund additional work zone patrols.

Why is the new work zone law important?

Each year, Indiana motorists are killed and injured in our state’s highway work zones. In 2006, 14 people died and 636 were injured in highway work zone crashes. Of the 14 killed, five were highway workers. The new law aims to increase safety in work zones by increasing work zone patrols, establishing higher work zone violation penalties and educating motorists about the increased penalties.

What is the new work zone law?

The new law requires Worksite Added Penalty Signs to be used in conjunction with all work on public roadways remaining open to traffic during the work activity period. Local agency, utility and private development work is included. The signs are not required for operations lasting less than one hour.

The Worksite Added Penalty Signs were designed by INDOT to meet the requirements of Indiana’s new work zone law. The signs read “Speeding Max $1,000, Reckless Driving Max 8 Years.” Use of the signs should begin immediately, and they are to be added to any current work activity.

What are the specifications for the new signs?

- The signs are to be installed on every mainline approach to the work area approximately 500 feet in advance of the first “ROAD CONSTRUCTION AHEAD” sign for rural projects or 100 feet in advance of the first “ROAD CONSTRUCTION AHEAD” sign in urban areas. The locations may be adjusted for field conditions.
- The standard size for the sign is 78” x 42”.
- Each sign is to be mounted on two type B, U-channel posts. Where the mounting height is five feet or less, two two-inch square posts may be used.
- Where the existing surface outside the pavement edge...
makes the installation of driven posts impractical or where the right-of-way does not accommodate the larger sign, the 60” x 36” version may be used provided that the posted speed limit is 35 mph or less.

- A set of two 48” x 48” signs may be used in series for rural applications where the right-of-way does not accommodate the larger signs, or for moving operations where construction signs are set and removed daily for changing work locations.
- Only the INDOT designed version of the signs may be used. While a number of sign fabricators are already familiar with the new signs, INDOT Construction Memoranda 7-14 provides complete details. Metric versions are also available.

For More Information:

View INDOT’s construction memo along with detailed diagrams of the new signs at:


Please direct any questions to Pat McCarty at (317) 234-5114 or David Boruff at (317) 232-5222 in INDOT’s Work Zone Safety Section.

Roadway Quality Management Program continued from page 8

dened by excessive moisture, they cannot adequately support the surface layers. This loss of support allows the surface layers to flex excessively, resulting in premature failure of the pavement.

**Spring Thaw.** In northern regions that experience deep freezing, frost heave can be a problem. In warmer areas such as Delaware that experience freezing but not deep freezing, spring thaw can be a more serious problem. In the spring, when the ice lenses in the “frost layer” melt, the trapped water weakens the supporting soil layers. This is the reason why the formation of potholes is typically the greatest during late winter and/or early spring.

**Expansive Soils.** Soils that are susceptible to shrinkage and swelling will experience significant changes in volume when moisture is allowed to accumulate. This change in volume can cause extensive damage to pavements. Shrinkage will result in loss of support for the pavement layers. Swelling will generate upward forces creating a heaving effect similar to frost heave.

In areas where wet subgrades can be a problem, the use of a permeable drainage layer and an underdrain system should be considered. Removing weak soils and/or the use of geosynthetics can also help greatly.

**Soft/Wet Subgrade**
Surface gravel should have a good, natural binding characteristic.

This road with poor surface gravel and poor roadway shape is not suitable for dust control treatment until better material is placed and roadway shape is restored.

Calcium chloride, magnesium chloride and, to a lesser degree, sodium chloride (road salt) have all been used successfully for dust control on South Dakota’s gravel roads. In addition, there are commercial products available for dust control under various trade names. Most of them fall into the categories of resins, emulsified asphalts or organic oils such as soybean oil extracts. Since these products are not being used as widely as chlorides and often differ widely in application rates and methods, this article will address only chlorides.

When chloride treatments are working well, they not only control dust which makes local residents happy, but the gravel surface remains tightly bound which reduces gravel loss and reduces blading frequency. In some cases, when traffic is heavy, the chloride treatments will actually pay for themselves by reducing the need to regravel and blade the road frequently. However, we have also seen poor performance and even failures with chloride treatments as well. Here are three major points to consider:

GOOD SUBGRADE AND GRAVEL ARE ESSENTIAL

If the road has a weak subgrade, the surface will constantly deflect under traffic and the surface gravel will never have a chance to form a crust. The quality of the existing surface gravel is critical. If the gravel does not have a good natural “binding” characteristic the chloride cannot do its job. Chloride is not a binder; but it will draw moisture from the air and keep the gravel surface damp and tightly bound when natural binder is present.

Gravel that has a good blend of stone, sand and fines is essential. Ideally, the gravel should have 7 to 12% of its total weight passing a #200 sieve. In addition to this, a minimum PI (plasticity index) of 5 is ideal. The
top size of stone should not exceed ¼ of an inch.

PROPER SURFACE PREPARATION

The road surface needs to be properly prepared before treatment. Loosen the top 1 to 2 inches of gravel. An ideal way to do this is to use a modern “bit type” cutting edge on the grader. These bits will have a shallow scarifying effect on the gravel and do a nice job of loosening the surface and blending the stone, sand and fines. Make sure the surface is crowned properly and shaped uniformly. If the material is dry, it is generally best to pre-wet the road prior to chloride treatment. An ideal time to treat a road is right after fresh gravel is hauled and spread.

PROPER APPLICATION

Liquid chloride should be applied through a pressurized spray bar that gives a uniform application across the road surface. Also the truck’s travel speed in feet per minute and the output of the spray bar in gallons per minute should be carefully calibrated so that a uniform application rate is made along the entire length of the road.

Flake chloride should be applied through a ground driven spreader (such as a broadcast fertilizer spreader) that can be precisely calibrated. Sand spreaders are often used, but they are not ideal.

One final point – don’t cheat on the application rate itself. A liquid treatment of under ½ gal. per square yard is seldom effective for the season. A flake treatment of under 1 ½ pounds per square yard is seldom enough.

“When chloride treatments are working well, they not only control dust which makes local residents happy, but the gravel surface remains tightly bound which reduces gravel loss and reduces blading frequency.”
**TRAINING SPECIALIST**

**Indiana LTAP,**

**West Lafayette, IN**

The Indiana LTAP is currently seeking to add a Training Specialist to its staff of professionals. Training Specialist duties include developing, directing, and assessing training programs presented to local transportation officials and other related professionals throughout Indiana and representing the Indiana LTAP at affiliate meetings and trade shows.

The successful candidate will have an M.S. degree in Civil Engineering and one year experience; or a B.S. in Civil Engineering plus 5 years experience; or no degree and 10 years experience in a local government agency transportation related position. Experience in a position for a local public agency with transportation-related responsibilities, or as a consultant or vendor that provides services and/or supplies to local public agencies is desirable. Experience in other fields of engineering may also be considered. Experience in providing training to transportation professionals is desired.

The Training Specialist is required to have strong oral and written communication skills along with knowledge of word processing, database development and management, spreadsheets, email, and the internet. He or she must also be capable of learning to use and demonstrate the use of traffic engineering tools such as traffic counters, speed detectors, and reflectivity meters.

Visit [www.purdue.edu/hr/employment](http://www.purdue.edu/hr/employment) for job listing and “how to apply”.

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**RESEARCH ENGINEER**

**Indiana LTAP,**

**West Lafayette, IN**

The Indiana LTAP is currently seeking to add a Research Engineer to its staff of professionals. Research Engineer duties include developing, promoting, and conducting technology transfer programs to provide training and implementation of the best practices for the operation of local roads and streets in Indiana. This will include the development of training materials and coordination with town, city, county, state, and federal officials, and University staff to enable these programs to be effectively presented throughout the state. Research efforts will relate to these technology transfer activities. The Research Engineer also makes decisions regarding the identification, demonstration, and education necessary to persuade local officials to adopt new or more efficient procedures.

The successful candidate will have an M.S. in Civil Engineering and 5 years experience; or a B.S. in Civil Engineering and 10 years experience; he or she must also be a licensed professional engineer. Prior experience in engineering, planning, and/or education is desirable.

The Research Engineer is required to have strong oral and written communication skills along with knowledge of word processing, database development and management, spreadsheets, email, and the internet. An understanding of Indiana local government, knowledge and experience in state and local highway planning, design, operations, and maintenance is highly desirable.

Visit [www.purdue.edu/hr/employment](http://www.purdue.edu/hr/employment) for job listing and “how to apply”.

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**HIGHWAY ENGINEER**

**Steuben County**

Steuben County is seeking an individual for the position of County Highway Engineer. A Baccalaureate Degree in Civil Engineering and Professional Engineer license is required. Individual will administer/perform construction engineering for federal and local highway and bridge projects. Must possess thorough knowledge/ability to make practical application of principles and practices of engineering, road construction/maintenance, department goals. Works with Highway Superintendent in planning/assigning personnel and material resources. Develops and implements traffic engineering studies, prepares related ordinances, reviews various plans/specifications for compliance with State and County ordinances, rules and regulations. Prepares department budgets, bid documents and specifications and submits applications/reports to federal, state and local agencies as required. Reports directly to County Commissioners. Resumes may be emailed to county-commissioners@co.steuben.in.us (MSWord preferred) or fax to (260)665-8483. Apply in person from 8:00 AM to 4:30 PM, M-F, or send resume to:

Steuben County Commissioners
317 S. Wayne St., Suite 2-J
Angola, IN 46703.
TRAFFIC CONTROL MANAGER  
City of Bloomington

Description:  
The City of Bloomington Public Works Department is seeking applicants to fill the position of Traffic Control Manager. Qualified candidates must have a thorough knowledge of the following:  
• Traffic signal operations and maintenance for the City’s 75 signals  
• Traffic signal programming and signal progression  
• The Manual on Uniform Traffic Control Devices (MUTCD) for signal, striping, and signage design to review traffic control plans  
• National Electric Code, NEMA Standards, IMSA Wire and Cable Specifications  
• Various Traffic Detection Methods (Acoustic, Radar, Loops, etc.)  
• Signal head types, specifications, and installation methods  
• Data communication methods  
Public relations and diplomacy when dealing with members of the public and business owners.

The selected candidate will manage a staff of up to eight (8) people, maintain an annual budget of $1.3 million, and be on call at all times for immediate repair of signals and regulatory signs. Candidate must work closely with the Director of Public Works, the City Engineering Department, and City Legal Department to analyze traffic control cost and design and to provide expertise in legal claims.

Qualifications:  
Candidates must have a BS in Engineering or related field, 3-5 years of experience in traffic control, and hold a valid IMSA Traffic Signal Level II Field Technician Certification (Level III is preferred). Candidate also must have excellent verbal & written communication skills and strong mathematics and computer skills (Word, Excel, Outlook, etc.)

Salary Range:  
Grade 9  
$47,000 - $51,583

Interested applicants should submit a resume and job application by 4:00 p.m., Friday, Aug. 31, 2007. For an application and more information about the position, please visit http://www.bloomington.in.gov/employment/. For any further information, please contact Adrian Reid or Toni McClure at 812-349-3417.

HIGHWAY ENGINEER  
Porter County

Porter County is currently taking applications for a County Highway Engineer. Applicant must be licensed by the State Board of Registration for Professional Engineers; experienced in highway engineering and construction; and a resident of Indiana during the engineer's employment. The County Highway Engineer shall be subject to the policies of the county executive and perform certain duties as set forth by the county executive.

For a job description and/or to submit an application, please contact:
Porter County Highway Department  
1955 S. State Road 2  
Valparaiso, IN 46385  
Phone: 219-465-3573

SAVE THE DATE!  
3rd Annual  
Local Transportation EXPO and Snow Plow Roadeo  
September 19-20, 2007  
Indiana State Fairgrounds  
1202 East 38th Street  
Indianapolis, IN 46205-2869  
Classroom sessions, outside demonstrations, and equipment expo!
Dear Colleague:

The Indiana Local Technical Assistance Program is soliciting ideas for technical projects to be funded by LTAP. These will be reviewed by the LTAP Technical Advisory Committee (TAC) for possible recommendation to the LTAP Advisory Board. Projects deemed worthwhile by the Advisory Board will be funded beginning in the 2008 calendar year. Samples of recently suggested projects are:

- Needs Assessment for Local Roads and Streets
- Managing Traffic Sign Retroreflectivity using the expected life of the traffic sign
- Permeable Pavements—A Midwest Installation Study
- Parking and Traffic Flow Analysis for downtown parking

Should you wish to suggest a project please send your ideas to the LTAP center no later than August 31, 2007. Requests can be sent by mail to the address below or faxed to (765) 496-1176.

I look forward to adding to the service of the LTAP center through this effort. If you have any questions, please feel free to contact me.

Sincerely,

John A. Habermann, P.E.
Program Manager

INDIANA LTAP
Vision Technology 1
1435 Win Hentschel Blvd., Suite B100
West Lafayette, IN 47906-4150