

# Crossroads

Fall 2000



TRANSPORTATION Information Center — LTAP

University of Wisconsin—Madison

## Tips for better brushing

Fall is a good time for cutting brush in right of ways. Richard Stark, WisDOT landscape architect offers some tips and suggestions:

✂ Fall is the season for spraying Krenite S. Applying it just before trees and shrubs start turning color keeps plants from leafing out the next spring. It lets crews spray at a less-busy season and avoids the “browncut” that occurs with conventional herbicides that must be used when the plant is actively growing. Browncut is unattractive and can bring calls from unhappy citizens.

✂ Treating stems after woody plants are dormant is very effective in preventing regrowth. Brush less than 3 inches in diameter need not be cut; just apply an herbicide such as GARLON 4 to the bottom 1½–2 feet of the stems. The product is absorbed into the tree which then doesn’t leaf out the next year. Cut brush with stems larger than 3 inches in diameter and treat the stumps. This approach reduces herbicide use.

✂ “Feathered” edges make more attractive roadsides, especially in heavily wooded areas. For safety in the clear zone, remove plants capable of growing over 4 inches in diameter. But let smaller plants—like dogwoods, sumac, and hazelnut—grow in between the ditch and the fence

line to avoid the “tunnel through the trees” look. Don’t let woody plants grow in the bottom of the ditch, though, because that could impede drainage.

✂ Where roadsides have sandy slopes with sparse vegetation, do brushing after the ground is frozen. Driving in with large brushing equipment tends to rut the slopes and open the soil to invasive weeds—making more work for next year. It may look odd to be out there mowing when there’s a little snow on the ground, but doing it then will protect roadsides against erosion and weeds.

✂ Work on the south and west sides of the roads first if you have limited time and money for brushing. “Daylighting” by cutting taller vegetation lets the sun help with thawing and ice control.



Example of “tunnel” cutting (top) and the more attractive results from “feather” cutting along roadside (bottom).

*Pesticide Applicator Training, refreshers, and certification exams are offered annually. Contact your County UW-Extension office for dates and application forms. Thanks to Richard Stark for these suggestions. Mention of specific commercial products does not imply endorsement by the T.I.C.*

### “Wet-Blade” mower system shows promise

Unique new equipment developed by the Burch Co. of North Carolina uses mower blades to apply liquid herbicides. Tests show it is very effective in permanently eliminating noxious weeds and preventing brush from re-sprouting. It uses significantly less herbicide than conventional spraying. Tests in Wyoming showed 98%

control of Canada thistle and 99% control of leafy spurge one year after treatment. Tests on alder, quaking aspen, and wild cherry are planned for British Columbia next summer.

The system uses the plant’s physiology, letting vascular action pull the herbicide right into the roots. Also, even with the

blade spinning at 200 mph, the herbicide goes only on the plant. It is not wasted on soil, rocks, etc.

Three commercial versions of the Wet-Blade System® ship this summer: for tractor mowers, boom arm mowers, and commercial turf mowers.

For information on this system call 336/667-9196 or check their web site at [www.wetblade.com](http://www.wetblade.com).

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## Idea Exchange

### Reflective stakes mark plow ends



Drivers can't miss seeing the plow blade and wing end when Mark Hertel clears snow off the Town of Koshkonong's roads. Four-foot-high red and white reflective markers stick up from each end. The flexible Fiberglas stakes are more often seen as markers for telephone boxes so plows won't hit them and they can be located in deep snow. It was Town Chair Paul Swart, a retired Ameritech employee, who got the idea of using them to mark the plow. "It makes it easier for the patrolman to see the plow and wing end," says Swart. A version designed for snow plows, called Fender Finders, is available from RoDon Corp. of St. Charles, IL. They can be shortened to any length and cost \$28 to \$42 per pair depending on color and mounting bracket.

For more information contact Swart at 920/563-2803. Contact RoDon at 630/232-1477.

### Wheels on plows conserve gravel



Operators have to be very careful when plowing gravel roads so they don't scrape off the surface with the snow. Road Foreman Larry Halvorson of Towner County Highway Department in North Dakota came up with a good idea. Why not put small wheels on the outside edges of the plow blade to control bounce?

Using salvaged wheel swivels from old farm drills, they built a framework and mounted 15 inch wheels on each end of the blade. With used radial tires, and salvaged metal for the frame, the cost was minimal. Earlier versions with smaller wheels did not hold up very well.

"The operators feel they can do a better job with this system," says Halvorson. "They are better able to hold up their speeds on the grader, reach out further with the blade, and as such able to throw the snow further."

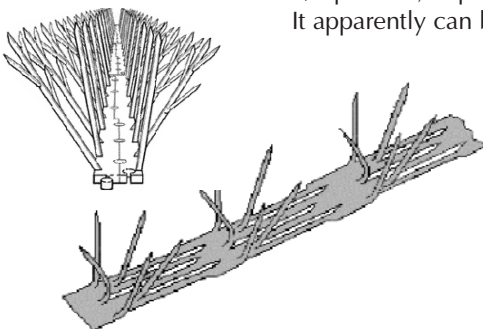
This idea won first prize in the North Dakota LTAP Center's "You Show Us" contest. For details, contact Halvorson at 701/968-4366.

### Prongs prod birds to flap on

If pigeons, sparrows, and other nuisance birds are finding a cozy home in your maintenance building, some ingenious folks have a product that can help send them on their way. Bird Guard™ is one of several companies that offer strips of steel or plastic prongs. When applied to joists, girders, ledges and similar places, they keep birds from landing and roosting. The steel prong product comes in five foot strips and costs between \$3.75 and \$5 per foot, depending on quantity ordered. Mastic is additional.

It apparently can be applied to any structure surface, lasts for 30 years, and needs no maintenance. Depending on the severity of your nuisance bird problem you may want to use several approaches at once, including poison bait and strip coverings for bay doors.

For more information contact Bird Guard at 800/331-2973, or at [www.birdguard.com](http://www.birdguard.com). (Mention of this product is for information only. No endorsement is implied.)



## Resources

Booklet copies are available from the T.I.C. Videotapes are loaned through County Extension Offices at no cost.

**NEW: Videotape Lending Library Catalogue**, T.I.C., June 2000, 54 pp. Lists and briefly describes over 230 tapes available from the T.I.C. video lending library. Great for your in-house training program. Tapes relating to topics in this issue of *Crossroads*:

- Shoulder Maintenance (#16654)
- Replenishing Earth and Gravel Shoulders (#16351)
- Maintaining and Controlling Roadside Vegetation (#17885)
- Pest Management Principles for Right-of Ways (#17724)

**Using Weight Limits to Protect Local Roads**, 1998, T.I.C. Bulletin No. 8. This 8-page fact sheet discusses how freezing and thawing affects local roads, and reviews the authority of local governments to protect local roads from damage by heavy vehicles by setting and getting enforcement of weight limits.

**How Vehicle Loads Affect Pavement Performance**, T.I.C. Bulletin No. 2. This 4-page fact sheet discusses the mechanics of pavement fatigue and how wheel loads, axles, tires, pavement base, and thickness affect pavement life.

**NEW: Drainage Manual**, July 2000, 16 pp. A new T.I.C. manual that guides local officials in evaluating the condition of drainage on their streets and roads. Dozens of photos make it easy to spot defects and to use the manual's simple rating system. The information will help you prioritize when and how to correct drainage problems. A companion to the PASER pavement surface rating manuals.

## Crossroads

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## Shoulder maintenance—too important to defer till spring

Road shoulders are an important part of the roadway. Yet, in the rush to complete projects before winter, some agencies defer shoulder work until spring.

This can result in shoulders which do not do their jobs: supporting the side of the pavement, draining water away from pavement into ditches, and providing vehicles a safe emergency area.

Fall shoulder repairs slow roadway deterioration, save money and reduce environmental impacts. Asphalt shoulders need repair if they are cracked, or if there is a gap along the pavement edge. Dirt or gravel shoulders need repair if they show one or more of the following conditions:

- The shoulder is higher than the pavement edge.
- The shoulder surface shows ruts and corrugations deeper than one inch.
- The slope is too flat to provide good drainage.
- The shoulder has eroded into cuts and gullies, causing cracks in the pavement edge and/or excessive material being carried into ditches.
- There is more than a 1½ inch drop-off from the pavement to the shoulder.

### How to repair shoulders

Two methods are used to correct dirt or gravel shoulders. Reshaping corrects excess height, ruts, and lack of slope. Crews use a motor grader to shape and smooth the shoulder slope. They should compact the shoulder, ensuring that it is not higher than the pavement edge.

Replenishing corrects holes, gullies and drop-offs. Crews reshape and compact the existing surface. Then they add, spread and compact additional material which should be granular and well-graded with sufficient fines.

Shoulders must support vehicle loads, so their materials should be similar to the road base. Before reshaping or replenishing, it might be necessary to remove organic debris, clays, silts, and other unsuitable materials.

Repairing asphalt shoulders uses the same methods as for asphalt pavements. Sealing gaps between the shoulder and pavement is necessary to prevent freeze-thaw effects.



Poor ditch and shoulder drainage cause pavement damage.

Reshaping ditches should also be considered. This is especially important as poor ditch drainage will affect the repaired shoulder and roadway base.

A new T.I.C. publication, the **Drainage Manual**, can help local highway officials assess and rate shoulder and ditch conditions. See **Resources**, page 2 for details. This story was adapted from an article in the *University of New Hampshire Technology Transfer Newsletter*, Vol. 14, No. 3.

## Long-term investment in roads pays off

The first community to ever use the PASER pavement rating system is still using it 13 years later. And the overall condition of the roads has improved considerably, according to former Town of Rutland Chair Mike Bacon.

“What it did was allow us to establish a long term direction and goal for how we wanted to spend our money,” says Bacon who still serves on the town’s roads committee. “We began to look at the roads as being an investment rather than an expense, and we wanted to invest our money in the best way possible.”

The town started using PASER as a simple paper-and-pencil system for comparing and ranking roads for improvement. The training and accompanying handbook made it relatively easy to see where the problems were. It also explained treatment alternatives.

“Basically, what the town was doing before was primarily just seal coating,” says Bacon. “Using PASER we were able to determine that other types of treatment



would be a better investment.”

Understanding that a road is only as good as the base it has under it, the town began a program of pulverizing and rebuilding old town roads. The first ones they did 12 years ago are still in excellent condition today. “So if we have a road that will last longer, we’re getting a better return on our investment,” Bacon says.

### PASER training in February

Towns throughout Wisconsin will have an opportunity to learn the PASER system at workshops in February. The T.I.C. is doing training at sessions in every county in the state, coordinated by local Regional Planning Commissions. PASER is an approved pavement rating system under the new state requirements that local government rate their roads and report them by December 2001. Announcements and details will go out in early winter.

“Many people think that the best town roads are in front of the supervisor’s house. Using PASER and its engineering recommendations helps supervisors avoid such perceptions,” says Bacon.

For more about Town of Rutland’s experience, contact Mike Bacon at 608/455-4580 or e-mail: [mlb1@chorus.net](mailto:mlb1@chorus.net)



# Overweight trucks cause costly road damage

New evidence shows that overloaded trucks are regularly traveling through Marathon County, and the roads are showing the effects. "We've got some north-south county roads that are showing rutting and the only heavy traffic is log traffic," says Marathon County Highway Commissioner Glen Speich.

When the county forest administrator looked at weight reports on county timber loads, they found that just one of six contractors reviewed was consistently hauling legal loads. The others were illegal 40%, 60% and 92% of the time, with the heaviest loads at nearly 108,000 pounds. That's 10,000 pounds over the winter frozen road limit of 98,000.

Pavement damage increases rapidly with higher axle loads, and worsens at a faster rate than the load increases, AASHTO research shows. That extra 10,000 pounds would cause 45% more

pavement damage. No wonder some Marathon County roads are showing wear.

Setting local load limits can be a tricky political problem. Local businesses may ask for exemptions and preferential treatment, arguing that their contribution to the local economy outweighs the cost of road damage. Using AASHTO's road damage units can help local officials put a price tag on the excess weight.

Enforcing state and local limits can also be a challenge. State Patrol resources are stretched thin, severely limiting the number of trucks they can check. Lack of easily accessible scales makes weighing the vehicles a slow process. And truckers who are running heavy may use local roads to evade detection.

## What's being done?

Marathon County, which operates five computerized truck scales, has given the State Patrol full time access. As a result, the officer can check twice as many trucks in a day. Highway department patrol truck drivers are keeping track of when suspicious trucks are passing through so law enforcement officers can catch them. Speich is also talking about asking

the State Patrol to train the Sheriff's department on enforcing load limit laws.

The Timber Producers Association (TPA) is talking with members. "We're trying to get the message out that hauling illegally is doing a disservice to the truck, the road, and the whole industry," says Executive Director Nadine Bailey. TPA is also talking to mill owners. "We know that these trucks are coming in and that they are overweight. In some states, they won't pay for anything over the legal limit," Bailey says.

Some counties are responding by refusing to enact frozen road laws. That puts county highways off limits to trucks carrying heavy loads that are legal on state highways. It's an approach that makes the already confusing array of laws and permits even worse.

"What we need is consistency through an area," says Oneida County Highway Commissioner Bob Maass, "That lets the State Patrol enforce the law better. We also need to get a statewide single trip permit." The wide variety of forms and frequent verbal approvals make enforcement even tougher, Maass says. As President of the Wisconsin Association of County Highway Commissioners, Maass is convening a committee to explore frozen road laws and overweight load permitting.

"The easier we can make it, the more chance we have for compliance," says Bailey of the TPA. "Everybody needs to understand that these trucks are an important part of the economy. To just say 'go away' is not good for any of us."

Local agencies should be aware of overload situations and be prepared to take action. Begin by contacting local haulers to discuss the problem and its consequences for pavement damage. Help them out by coordinating preferred haul routes and winter and spring changes—both timing and limits—with neighboring agencies. Also, make it easier to enforce load limits. Use written permits for overweight loads and avoid verbal permission. Also, coordinate with your local law enforcement officials about who to contact, where and when scales can be used, likely sites and timing of illegal loads.

For information on pavement damage units, see the T.I.C. fact sheet "How Vehicle Loads Affect Pavement Performance." For information on spring road posting, see "Using Weight Limits to Protect Local Roads." Both are available free. Use the form on page 7. Contact Bob Maass about the WACHC committee at 715/369-6184. Talk to Glenn Speich about Marathon County's efforts at 715/842-2205.



Information on road damage units can be helpful in talking to haulers and persuading others to support enforcement. Two T.I.C. factsheets have more information.

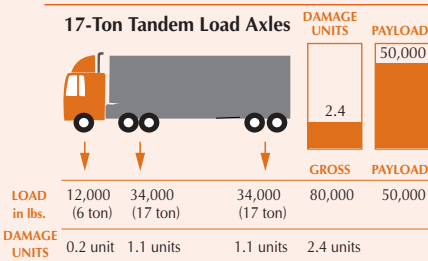
## Calculating road damage from heavy loads

AASHTO studied the relationship between axle load and road damage as a tool for designing new roads. The basic damage unit is one pass of 18,000 lbs on a single axle. A semi-trailer truck with five axles weighing 80,000 lbs gross (Wisconsin's load limit) would produce 2.4 damage units.

As the total load increases so does the load per axle. However, the damage increases at a much faster rate than the load. For example, if the total load on a standard tractor trailer (18 wheeler) increases from 80,000 lbs to 90,000 lbs the damage goes from 2.4 to 3.0 units—a 25% increase.

If the same truck goes from 98,000 lbs to 108,000 lbs, the damage goes from 5.38 to 7.7 damage units—a 43% increase! Comparing damage units between a standard 80,000 lbs and an overweight 108,000 lbs is an even more alarming 220% increase. Adding more axles will help considerably in reducing damage. The attached table shows the differences.

AXLE Gross load	DAMAGE UNITS	
	Single axle	Tandem axle
18,000	1.0	
20,000	1.5	
22,000	2.18	
24,000	3.03	0.2
26,000	4.09	0.364
28,000	5.39	0.495
30,000	6.97	0.658
32,000	8.88	0.857
34,000	11.18	1.095
36,000		1.38
38,000		1.7
40,000		2.08



## New mine safety training rules

A new rule about mine safety training, 30 CFR Part 46, takes effect in October. It makes quarry owners, including local municipalities, responsible for providing appropriate types of safety training. Street and highway staff who collect sand and aggregate from nearby quarries are covered by the rule.

Two categories affect locals. Those who drive trucks into the quarry to be loaded should receive "Site Specific Hazard Awareness Training." This is usually a 20-30 minute orientation to the site and its

health risks, traffic patterns, restricted areas, signals, and safety and emergency procedures. It can be fairly simple, such as watching a video. Some operators offer annual stickers for drivers' hard hats to show they have been trained.

Those who get out of their trucks to operate equipment to load their own trucks are classified as miners and should receive refresher training—usually an eight hour annual training course. This Mine Safety Hazard Act rule applies, however, only if a crusher is present in the quarry, whether it is working or not.

If there is just a stockpile on site and no crusher, the driver/operator is covered under a different set of rules administered by OSHA, the federal Office of Safety and Health Administration.

"There's a lot of misinformation on this," says Patrick Murphy, mine safety training specialist with the state Department of Commerce. "Basically, it's up to the mine operator what training is required." By March 2001, operators must meet all requirements of 30 CFR Part 46.

The best approach is to talk to the owner/operators of quarries you contract with and find out their training plans.

## Calendar

### T.I.C. workshops

Specific details and locations are in the announcements mailed to all **Crossroads** recipients. For additional copies, or more information, call the T.I.C. at 800/442-4615.

**Winter Road Maintenance** Prepare for winter operations. This workshop covers what's new in equipment, understanding snow and ice, ways to improve the effectiveness of salt and sand, and effective plowing and winging techniques.

Oct 4	Green Bay	Oct 10	Cable
Oct 5	Brookfield	Oct 11	Eau Claire
Oct 6	Barneveld	Oct 12	Tomah
Oct 9	Rhineland		

### Local Transportation Issues ETN Series.

T.I.C. and the UW Local Government Center are presenting a five-session series on transportation at over 103 ETN locations throughout Wisconsin. All workshops (at \$12 per session or \$50 for all five) are on Thursdays from 10:30 a.m. to 12:20 p.m. Call 608-262-9960 for a brochure.

#### Utilities in the Public Right-of-Way—Oct 5

Review the powers that local governments have to control utilities. Consider what ordinances, permits, fees, and inspections are needed. Get an update on the Public Service Commission's ruling on this matter.

#### Pavement Marking—Nov 9

Review the appropriate use of center line, edge line, no-passing, crosswalk, and other pavement markings. Learn about safety considerations, materials, and maintenance.

#### Transportation Planning—Jan 18

Focus on the transportation element of the state's Smart Growth comprehensive

planning requirement and how to do a transportation plan. Hear about grants for comprehensive planning.

#### Liability and Legal Issues—Feb 15

Improve your understanding of road related legal issues and liability management techniques. Topics include liability of elected officials, agency responsibilities, and suggestions for sound management.

#### Local Road Database and Transportation Aids—Mar 8

Update your understanding of the local road inventory and the WISLR system. Review the current status of local transportation aid programs.

**Using Geotextiles** Learn about the many kinds of geotextiles, their costs and benefits, and when and how to use them in road construction and maintenance, drainage projects, soil erosion control and stabilization.

Oct 30	Barneveld	Nov 7	Cable
Oct 31	Brookfield	Nov 8	Eau Claire
Nov 1	Green Bay	Nov 9	Tomah
Nov 6	Rhineland		

**Basic Work Zone Traffic Control.** For road supervisors and maintenance personnel who plan and set up work zones, this workshop covers traffic control devices, the parts of a work zone, a variety of work zone set ups, including mobile operations, plus pedestrian, worker, and flagger safety. Participants will set up work zones using the *Wis. Pocket Guide to Work Zone Safety*.

Jan 9	Tomah	Jan 16	Green Bay
Jan 10	Eau Claire	Jan 17	Brookfield
Jan 11	Cable	Jan 18	Brookfield
Jan 12	Rhineland	Jan 19	Barneveld

### UW—Madison Seminars

A limited number of scholarships are available for local gov't officials for courses in Madison. Use the form on page 7, call 800/442-4615, or email sauer@engr.wisc.edu for details.

**Comprehensive Culvert Design**, Sep 18-20  
**Open Channel & Ditch Design**, Sep 20-22  
**Neighborhood Design & Traffic Calming**, Oct 11-13  
**Managing Snow & Ice Control Operations**, Oct 23-24

**Implementing a Sidewalk Management System**, Oct 25-26

**Urban Forestry Techniques for Engineering & Construction**, Nov 13-14

**Soil Engineering for Non-soils Engineers & Technicians**, Nov 16-17

**Highway Bridge Design**, Dec 4-6

**Effective Bridge Rehabilitation**, Dec 6-8

**Minimizing Pavement Damage Caused by Utility Cuts**, Dec 11-12

**Improving Public Works Construction Inspection**, Jan 16-17

**Maintaining Asphalt Pavements**, Jan 18-19

**Traffic Signal Design, Operation, & Maintenance**, Feb 12-14

**Managing Street & Highway Design Projects**, Feb 15-16

### Other Training Opportunities

Test your best crew in friendly competition at the Wis. Chap. American Public Works **Snow Plow Rodeo** on Wed., Sep 27 at the Waukesha Co. fairgrounds. It's a great way to get everyone tuned up and ready for winter. Call Mark Hochschild at 414/761-5372 for more details.

**Public Works Supervisory Academy** This certificate program in supervisory skills is 10 one-day courses offered by UW-Madison. Programs are taught regularly at locations around the state. Contact Gregg Miller, Professional Development & Applied Studies, for more information at 608/263-8256.

## Staying alert—tips for snow plow operators

Sadly, winter storms rarely conform to work-day schedules. So when operators must suddenly spend their nights clearing roads, they have two problems: staying awake and alert while plowing and getting decent sleep afterwards. Everybody has their favorite tactics, but now here are some facts and recommendations based on documented sleep research.

Even a small reduction in sleep—two days in a row of sleeping six hours—can slow reaction times by 10-15 percent, says one study. Others show that sleep debt accumulates and increasing sleepiness is associated with decreases in vigilance, reaction time, memory, psychomotor coordination, information processing and decision-making.

“The real problem is the body’s circadian [daily] rhythm system,” says Dr. Steve Weber, Director of the Sleep Disorders Clinic at the UW Hospital and Clinics in Madison. “Working at night means you’re swimming against a powerful biological drive to sleep.” He notes that trucking industry data show a major increase in the number of fatal accidents between 5:00 and 7:00 a.m.

### What can you do to stay awake?

“The best thing operators can do is take a nap before they have to go on their shifts. A one or two hour nap from 10:00 p.m. to midnight before a 12:30 a.m. shift will probably improve their alertness on duty,” says Weber.

Beware of the hours between 4:00 and 6:00 a.m. That is when the biological urge to sleep is strongest and operators will have significant problems with alertness, fatigue, and attention.

Weber recommends taking a break in the middle of the shift, around 3:00 a.m., to eat a nutritious meal—protein, veggies, fruit and starch, not a bag of doughnuts or burgers and pie. “This has been shown to help night workers stay alert on the job and maintain sleep during the day,” says Weber. He notes that malnutrition and stomach disorders are a frequent problem among shift rotators and night workers.

“If possible, a 15 minute nap at that time might be a good idea,” says Weber. It would be easy to oversleep, though, so the operator would need some type of wake up alarm system.

Caffeine works too. A 600 milligram dose of caffeine (six 8-oz. cups of regular coffee) improves performance, alertness and mood, according to military research on pilots flying night sorties in Bosnia. Another military study reports that a daytime nap followed by two cups of coffee restores nighttime alertness to daytime baseline levels.

Those who don’t like coffee can try caffeine pills or chewing gum, caffeinated water or soft drinks. The caffeine’s effect peaks within an hour and may not completely wear off for eight hours or more. (Operators should avoid caffeine during the last half of their shifts so they can sleep afterwards.)

Other strategies to increase alertness, such as opening the window to let in cold air, listening to the radio, or taking an exercise break, are of marginal benefit, and less effective than taking caffeine and a brief nap according to a report in the *Journal of the American Medical Association*.

### After the shift

Driving home is one of the biggest risks for people who have worked all night. Shift rotators and night workers have seven times the number of auto crashes in the morning hours as “day active” people, according to Weber. Icy roads and poor visibility increase the risks.

“Don’t stop at the bar on the way home,” says Weber. Sleepiness and alcohol interact to produce a much more profound effect, making the rest of the drive home even more hazardous. Also, drinking alcohol within two hours of going to sleep will make post-shift sleep less restful.

Most people can manage okay if they only lose one night’s sleep. But when they must work two or more nights in a row, it is important to get quality sleep in between.

Here are some suggestions for better post-shift, daytime sleep:

- Avoid caffeine during the last half of the night shift and in the time before sleeping. And the older a person is, the longer it takes for his liver to eliminate caffeine from his system. In addition to the obvious sources—coffee, tea, colas—caffeine also lurks in some over-the-counter medications like Excedrine tablets and cold/flu syrups. Some coffee-flavored ice creams and yogurts have significant caffeine, as do Sunkist orange soda, Mountain Dew, Josta, and even Barq’s root beer.
- Eat lightly after the shift. A large, heavy meal will interfere with sleep.
- Don’t smoke tobacco for several hours before sleeping. Nicotine is a stimulant.
- Keep light out of the sleeping area. Hang heavy blankets over windows and block the door jam to keep light from creeping in. During the Gulf War, US pilots flying night missions actually slept in windowless, sound-proofed trailers so they could fool their bodies into thinking day was night, and night was day.

In the end, the only safe countermeasure against driving while sleepy is to stop driving, and the only way to reverse the physiological need for sleep is to sleep, preferably at night. The good news is that napping an hour or two or sleeping late a couple mornings after the snow is cleared will quickly pay off that sleep debt.

For more information see: “Sleepiness, driving, and motor vehicle crashes,” in *JAMA, The Journal of the American Medical Association*, June 17, 1998, v. 279 n. 23 p. 1908 (6).

### Caffeine Content of Drugs & Beverages

#### Over-the-Counter Drugs

NoDoz (max. strength)	1 tablet	200 mg.
Vivarin	1 tablet	200 mg.
Excedrin	2 tablets	130 mg.
NoDoz (reg. strength)	1 tablet	100 mg.
Anacin	2 tablets	64 mg.

#### Coffees

Brewed	8 oz.	135 mg.
Instant	8 oz.	95 mg.
Decaffeinated	8 oz.	5 mg.

#### Teas

Tea, leaf or bag	8 oz.	50 mg.
Snapple, all tea varieties	16 oz. bottle	48 mg.

#### Soft Drinks (12 oz.)

Josta	58 mg.
Mountain Dew	55 mg.
Surge	51 mg.
Diet Coke	47 mg.
Coca-Cola	45 mg.
Dr. Pepper, regular or diet	41 mg.
Sunkist Orange Soda	40 mg.
Pepsi-Cola	37 mg.
Barq’s Root Beer	23 mg.



#### Caffeinated Waters

Java Water	125 mg.
Krank 20	100 mg.
Aqua Blast	90 mg.
Water Joe	50-70 mg.
Aqua Java	50-60 mg.





# New approaches for drainage

It's important to get water away from your roads, and it's important to plan for where it goes too. As it runs off pavements, lawns and fields, stormwater picks up lots of phosphorous, nitrogen, soil, and sediment. These hitch-hikers drop off in local waterways where they can do plenty of harm. The extreme rains of May and June in some parts of the state have made the problem especially bad this year.

City of Waupaca has a better idea. It has built several basins to hold the runoff and filter the water. One of them was part of a recent road reconstruction project. The added cost was minimal—just about \$5000.

The drainage field along Tower Road is actually three connected basins covering about two acres. The land became part of the right of way in a project to re-align and widen the road. Each one has an out-fall several feet higher than the basin bottom. This holds back the water so it ponds and sediment drops out. The sandy soils slurp up the water, filtering out the nutrients. Since 1997, there has been no discharge from the third basin, even with this year's extraordinarily heavy rains.

"We just graded it as part of the project," says Waupaca DPW Director John Edlebeck. Edlebeck expects that aquatic plants will naturally grow in the basins as the sediment layer holds more moisture near the surface. The basin area is usually dry between storms.

Waupaca has built other basins as well. A pair of two-acre basins trap sediment and runoff from 70 acres in a local industrial park. They were each constructed for less than \$3000. "It was basically just an earthwork," says Edlebeck. "It's a major improvement to get that area off of direct drainage to the creek."

Another project, at Churchill Street, is now a one-acre wetland which volunteers planted in spring 1999 with over 4000 aquatic plants.

"We had an opportunity to intercept a 30 inch storm sewer draining a roadway system. We're now filtering the stormwater before it gets to the Crystal River which is a high quality trout stream," says Edlebeck. That was a bigger project, costing about \$30,000.

Retention basins have other benefits too. They slow storm water to help prevent downstream flooding. Instead of rushing away, the stormwater stays to replenish the groundwater system which is the source of drinking, stock and

irrigation water for rural property owners. Many municipalities, such as Waupaca, also rely on groundwater.

For more information on sediment and filtration basins, contact John Edlebeck, 715/258-4420, or e-mail at jedlebec@cityofwaupaca.gov.



## Reader Response

If you have a comment on a **Crossroads** story, a question about roadways or equipment, an item for the *Idea Exchange*, a request for workshop information or resources, or a name for our mailing list, fill in this form and mail *in an envelope* to:

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# On-site work zone training gets everybody on board

The slower pace of October and November, before snow flies, is a great time to invite the T.I.C. to your place for a day-long Work Zone Training session. You save the travel cost and time of sending two or three people to the session in another community, and for a relatively low price, everybody on your staff can be trained.

Retiring Walworth County Highway Commissioner Ben Coopman is glad he did it in April. "It's come in handy a number of times when people who don't do work zone set ups all the time had to do it," Coopman says. "It really cut down the set-up time. They knew where to look and how to look it up in the booklet, and how to read the diagrams."

The county sponsored two sessions and invited towns to send representatives too. The second session also helped cover people who were on vacation or out sick for the first date.

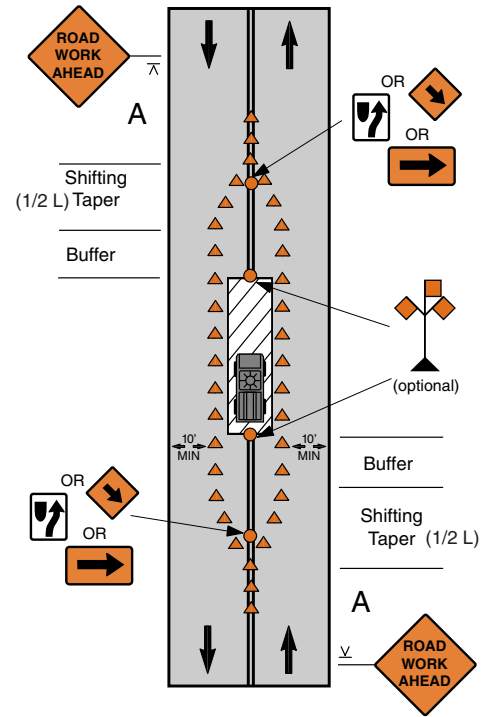
For off-site training, usually only supervisors can go. With the training

on site, even entry level workers were included, and they appreciated it. "One comment I heard was, now I've got a better understanding of the things you have to take into account for a site like liability and judgement; it's not just black or white," says Coopman.

*An on-site workshop helps train everybody to use diagrams like this one.*

The six hour training session costs \$400 for up to 30 participants, \$800 for 30-60. It covers basic work zone rules and lets participants apply them through group problem solving exercises. All participants receive their own Wisconsin Work Zone Safety pocket-size guide. In addition to your own work force, consider inviting local contractors and utilities who work in your rights of way, and neighboring municipalities.

*To schedule a Basic Work Zone workshop at your site, call Jane Sauer at 800/442-4615 or e-mail at: sauer@engr.wisc.edu*



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