



Chain saw safety

"When you go to work with a chain saw, attitude is the single most important thing you've got going for you," says Ken Lallemond, lead Loggers' Safety Trainer for FISTA, the Forest Industry Safety & Training Alliance, Inc. "If you have a good attitude and a good common-sense approach to your job, you'll make sure you have personal protective equipment, and not just because OSHA requires it." Lallemond taught a recent T.I.C. chain saw safety workshop.

Working safely with a chain saw starts with attitude and training. "There's no other job or piece of equipment that's treated so casually in the work environment," says Lallemond. What employer would consider handing over the keys of a back hoe to a new recruit and telling him to get started? Yet the "school of hard knocks" seems to be the only training many chain saw operators get. Both the employer and the worker are responsible for ensuring a safe operation. This includes proper training, good body mechanics and felling technique, well maintained equipment, and protective clothing.

The majority of accidents are not dramatic cuts or broken limbs, but back and neck injuries from poor technique when cutting and lifting. "Injuries due to bad body mechanics are costly because they result in so much down time," says Lallemond. "And they come back to haunt you for years."

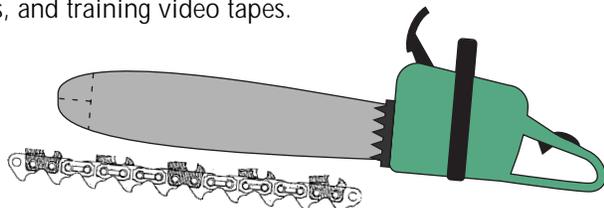
Learn good cutting technique and proper saw operation from the start such as keeping the saw close to the body and "lifting smart" by bending from the knees not the waist, says Lallemond. It will save on a lot of pain and suffering. In addition, using good body mechanics will lessen fatigue and keep you more alert throughout the day. To assist with this learning, FISTA offers chain saw training programs, safety guides, and training video tapes.



Proper training, which is often neglected, is essential for safe chain saw operation.

Proper chain saw maintenance also promotes safety. Operators should know how to sharpen cutters to manufacturer's specifications, set proper chain tension, tune the carburetor, and clean, lubricate, and adjust the saw. In addition, before starting work they should inspect and test the chain brake, chain catch, throttle lock, handles and guards, all nuts and bolts, spark arrester and muffler, and the air filter.

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Idea Exchange

Recycling antifreeze

What do you do with 100 gallons of used antifreeze? That's how much antifreeze the City of Milwaukee fleet service has to handle every month. These days the fleet service is recycling and reusing their antifreeze, and saving money too.

One company comes out to the repair shop and recycles the material on site. Another company hauls the used material away to recycle it in their facility.

"Before the recycling program we tried another vendor. They were charging about 50 cents a gallon at that time to remove it. Now we pay about \$2 a gallon to have it recycled," says Dave Rochester, Milwaukee DPW fleet service inventory control clerk.

Not only does recycling keep the propylene and ethylene glycol out of the environment, says Dave Jensen of Jensen Environmental Management in Muskego, it also removes impurities in the water that was used to dilute it initially. Iron, for example, can build up sludge deposits in the vehicle engine and damage it. It is not necessary to have antifreeze to exchange; Jensen also hauls excess material and sells the recycled product as needed. The cost varies by quantity but averages around \$1.65 a gallon, Jensen says.

For more information contact Dave Rochester, Milwaukee DPW Fleet Services, at 414/286-2734. Mention of a commercial business does not imply endorsement.

Leaf collector saves labor

The large hose out front makes it look like an elephant, but Ripon's leaf collector saves more than peanuts for the city. One person can operate the equipment alone, cutting manpower needs by two-thirds. It also saves on back injuries, according to Richard Fenner, Ripon's Public Works Operations Superintendent.



The first leaf collector was specially modified for Ripon by American Roads of Ohio. A pull-behind leaf loader was set on a custom-wheeled frame and had hydraulic cylinders installed to move the hose. It cost about \$20,000 in 1987. In 1992, using city forces, they modified a second one using an older pull-behind leaf vac. The cost was just under \$8000.

The leaf vac attaches to the front of the truck using snowplow mounting hardware and the hose that vacuums up the leaves is operated with the joystick that is also used for



the plow wing. A 25 yard bulk box slides inside the truck's dump body to hold the chopped leaves. The box is covered by 1/4 inch mesh to keep the leaves from blowing out.

"The operators thought it was a good idea because nobody wanted to be dragging the hose around," says Fenner. Ripon operates two "leaf suckers" for \$456 a year for gas and an average of \$618 a year in labor and repair parts. Each unit collects 520 tons of leaves a year in the same number of days as it previously took for the old three-man crew system.

For information and general specs contact Richard Fenner at 920/748-4910.

Do you have an idea to share with Crossroads readers? Let us know what it is and we'll contact you for details. Use the form on page 7.

Crossroads

This newsletter provides information on roads and bridges to local officials and is published quarterly by the Wisconsin Transportation Information Center, part of the nationwide Local Technical Assistance Program (LTAP). **Crossroads** is produced with assistance from the Federal Highway Administration, the Wisconsin Department of Transportation, and the University of Wisconsin-Extension.

Non-profit organizations are welcome to reproduce articles appearing here. Please contact us first for any updates or corrections.

Wisconsin Transportation Information Center, UW-Madison Department of Engineering Professional Development, 432 N. Lake St., Madison, WI 53706

Phone: 800/442-4615 Fax: 608/263-3160, or e-mail to individuals below.

Don Walker, *director*
Steve Pudloski, *staff*
Mercy Ranum, *program assistant*
Lynn Entine, *writer and editor*
Susan Kummer, *graphic artist*

donald@engr.wisc.edu
pudloski@engr.wisc.edu
ranum@engr.wisc.edu
Lynn Entine Writing & Editing
Artifax

Excavations and trenches are more dangerous than you think.



Trenching and excavation quiz

- 1) How much does a cubic yard of soil weigh?
- 2) What is the most common soil involved in fatal accidents?
- 3) True or false: workers won't die in a cave-in unless completely buried.
- 4) How many people are killed and injured a year in trenching and excavation accidents?

Answers: 1) 2700-3600 lbs depending on soil type.
 2) Cohesive types like clay since they appear more stable than they are. 3) False. A person buried up to the neck may be unable to breathe because of the crushing weight of the soil. 4) 100-400 killed, 1000-4000 injured.

Digging? You need a competent person

Every excavation or trenching job site has the potential to injure or kill if good safety practices are ignored. "Not understanding the seriousness of the hazard and laziness are two of the most common reasons for cave-ins," says Harry Butler, Authorized NUCA Competent Person Instructor. "Nobody has X-ray vision," Butler says. "You can't tell how stable the soil is, especially in Wisconsin with our inconsistent glacial soils."

Following the standards required by OSHA will help ensure safety at an excavation site. The four most common violations of these standards are:

1. Not providing adequate protective system to prevent cave-ins. This includes sloping the sides, using a boxlike trench shield to provide a safe work place, or using wood or hydraulic shoring along the sides. Shoring, sloping, or shields are required for any excavation greater than five feet deep.
2. Not having a competent person on the job. A competent person is trained to recognize hazards and understand the soil classifications to determine what protective systems are appropriate. The competent person should inspect the project every day before any worker enters an excavation and must have the authority to stop work if a hazard exists.
3. Failure to set the spoil pile back from the edge of an excavation at least two feet.
4. Failure to provide proper access to a trench such as a ladder or ramp. Trenches four feet deep or more must have access within 25 feet of where men are working.

The National Utility Contractors Association (NUCA) has developed a training program to help contractors educate competent persons. After the eight-hour program, participants should know the OSHA excavation standard, be able to identify hazards associated with trenches and excavations, demonstrate correct soil testing procedures, and understand different protective system types. Successfully passing the final open book test earns the participant

a certificate of completion wallet card, a hard hat decal, and 0.8 continuing education units. This program is approved by DILHR for plumber and sewer master/journeyman training. In addition to Harry Butler, there are two other NUCA certified instructors in Wisconsin, Mark Miner in Stevens Point (Stevens Construction) and Wayne Simmons in Milwaukee (Milwaukee Fire Department).

For more information on Competent Person training, contact Harry Butler, Butler Engineering, Inc., W230S4431 Milky Way Rd., Waukesha, WI 53186, 414/650-2000. (Sadly as this story was being prepared in early February, an Oak Creek, Wisconsin, construction worker died in a cave-in.)

Resources

Materials are available from the Wisconsin T.I.C. unless otherwise noted. Call 800/442-4615 or use the form on page 7. Videotapes are loaned free through Wisconsin County Extension Offices.

What is the Safest Vehicle Color? (14 pp.) This collection of six short articles presents the results and recommendations of several studies that tried to identify the safest color(s) for vehicles.

Gwinnett County, Georgia, Policy on Speed Humps, (15 pp.) A report summarizing this county's approach to traffic calming using speed humps. It includes criteria, design standards, and the results of before and after studies.

Chain Saw Safety Training Guide, Forest Industry Safety & Training Alliance, Inc. (FISTA), January 1998. A guide to safe and effective chain saw use. Developed for use by urban foresters, street and highway employees, and private land owners.

New Video Tapes

Chain Saw Safety, Maintenance, and Operation (#18115 - 19 min.) Demonstrates chain saw maintenance, proper use of protective equipment, and felling, limbing, bucking, and topping techniques.

Body Mechanics for Arborists (#18116 - 23 min.) Describes in detail how to prevent back pain and injury while performing a wide array of forestry activities in urban, suburban, and rural settings. Designed for municipal, utility and tree service workers.

Compact now, save later

Spring construction season is just weeks away so it's time to think compaction. Proper compaction is a simple and economical way to increase road life and carrying capacity.

In base course preparation, culvert backfills and utility trenches, asphalt paving, and especially asphalt joints, dense, well-compacted material will:

- ensure greater strength for supporting heavier loads
- reduce settlement over the life of the road or patch
- decrease permeability to water and air
- resist rutting

Moisture content and soil type are the two major factors that influence soil compaction. Moisture content must be determined by test and can be modified for better compaction. Soil type dictates the relative number of passes required, the thickness of compaction layers, the type of compaction equipment, and the impact of moisture on compaction.

It takes considerable effort to compact clays. Repeated light loads on six to eight inch layers using sheepsfoot rollers is the most effective approach. Sands, being porous, need just a few passes of heavy loads in eight to 10 inch layers using pneumatic tired rollers.

Crews filling around culverts commonly work too fast for the tamping crew. As a result the soil surrounding the culvert does not develop the critical strength to support design loads. Compact backfill in six to eight inch layers to a distance of at least one diameter of the culvert on each side, if possible.

Compact nativenning, time is a critical factor. The contractor must finish compacting before the asphalt cools down to the minimum 175 °F. Layer thickness and base temperature affect cooling rates. Thus, thin asphalt surfacing layers laid in early spring and late fall are more likely to fail early. Other factors include air temperature, base layer moisture, laydown temperatures, winds, and sunshine.

The most difficult place to develop good density in asphalt pavement is at the longitudinal joints. For long lasting conventional joints, overlap the hot lane about



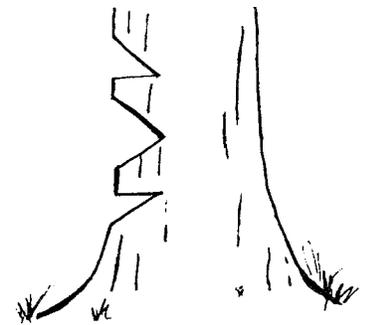
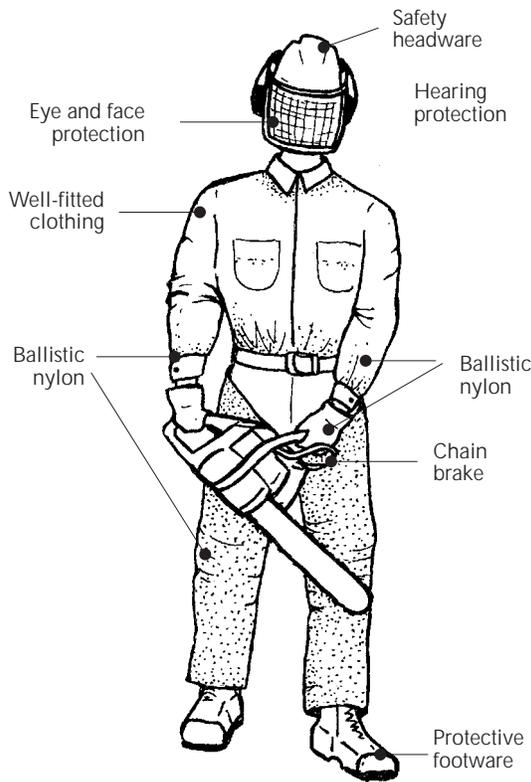
Chain Saw Safety

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Personal protective equipment is "the last line of defense to protect against injury," says Lallemond. OSHA requires the employer to provide personal protective equipment at no cost (except for boots) and to make sure it is worn. Proper equipment includes:

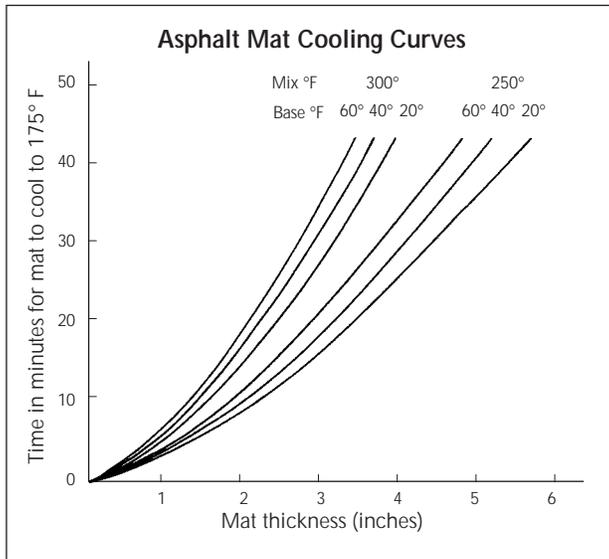
- safety leg coverings from boot top to upper thigh
- safety helmets
- eye or face protection
- hearing protection
- gloves or mitts for workers handling chain saws
- safety, waterproof, logging style boots (chain saw resistant for saw operators)
- first aid kits at work site and in crew vehicles
- first aid and CPR training for all supervisors and employees

Having a tree felling plan, and following it, are essential for everybody's safety. You must know how you're going to get the tree to the ground before you make any cuts. When two or more are working together, all



These illustrations were adapted from the Loggers' Safety Training Guide and are reprinted here with permission from the Forest Industry Safety and Training Alliance, Inc.

FISTA, a nonprofit organization, offers a variety of Chain Saw Training sessions. Counties, towns, cities and villages can arrange for group sessions (12-15 participants) and other sessions. For information contact the FISTA office: 1-800-551-2656. Videotapes may be purchased from FISTA or borrowed from other sources.



Source: *Time Available for Compaction*, James A. Scherocman, **Better Roads**, April 1984

one inch onto the cold lane, laying the hot material about 1/4 inch higher for each inch of the compacted cold lane height. Either the shoulder side or the joint side can be rolled first. In either case, don't overlap more than six inches into the cold mat. State specs also permit a new tapered joint technique that has been successful in other states.

Whatever the material and the situation, paying attention to detail and doing a high quality job of compaction means less maintenance later and more money for other projects.

*For more information on compaction see T.I.C. Bulletin No. 11 **Compaction Improves Pavement Performance**, and No. 17 **Managing Utility Cuts**. For information on compacting joints, see "A joint's a cinch when you pinch" in the Summer 1994 issue of **Crossroads**. Copies are available from the T.I.C.*

others must work at least two full tree lengths from the person cutting the tree. Addressing safety while being efficient at the job is the goal of a felling plan. It doesn't take long to determine:

1. **Hazards** – overhead power and phone lines, nearby buildings, rotted or broken limbs, wind strength and direction, snags or hangups, and others
2. **Lean** – forward, side, or backward slant of the tree
3. **Escape route** – at least a 20 foot clear path at a 45 degree angle away from the falling tree
4. **Hinge** – length and width of hinge needed to control the tree's fall
5. **Cutting plan** – the type and depth of notch; need for boring or wedges

"Most importantly, if you're not comfortable with the task, walk away from it," says Ken Lallemond. "Get somebody else with more skill and experience who can do the job safely."

Daily 5-point chain saw check

Chain brake – A working chain brake stops the chain instantly before it can cause injury if the saw jumps up and hits the operator's wrist or jumps out of the hand.

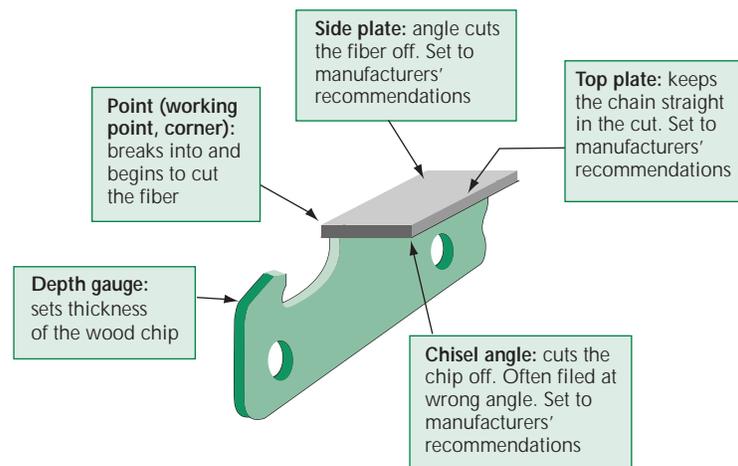
Chain catch – This white metal or hard plastic knob is standard on all saws in the last 10 years. It shortens the travel distance if the chain comes off the bar. Chain catches are designed to break to preserve the chain and often are never replaced because their function is not understood.

Throttle lock – Located in the rear of the handle bar, the throttle lock prevents accidentally engaging the throttle, as might happen in a brushy area if a stick gets caught in the throttle.

Nuts and bolts – Loose or stripped out bolts on handle bars are the most dangerous. Check and tighten. For stripped threads, plug the hole and retap it.

Spark arrester and muffler – Sparks can start fires. Excess noise forces hearing protection to work too hard. Exhaust systems that don't provide the proper back pressure can shorten the saw's life.

Know your chain saw cutter



Quick checks for aggregate quality

Local aggregate supplies are usually the least expensive. To protect your investment in maintenance and reconstruction, you need to make sure you're getting the right quality. Testing against state specs is the surest way, but you can also evaluate local aggregate by look and feel.

Quality aggregate meets specified limits on certain characteristics according to Bruce Pfister, WisDOT Chief Geotechnical Engineer:

- *Wear* – resistance to abrasion
- *Soundness* – resistance to chemical reaction
- *Liquid limit* – moisture content at which it starts acting like a fluid
- *Plasticity* – moisture content at which it can be worked
- *Percent fractured faces* – 45% or more with at least one cracked side
- *Gradation* – variety of particle sizes from 1½ inch to dusty fines

See the chart on page 8 for common aggregate types in the state and what to look for at the pit or quarry.



Calendar

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

Roadway Maintenance This workshop is your opportunity to improve your street and road maintenance operations. It will include pavement maintenance techniques, rehabilitation and recycling, and spring maintenance activities.

March 11	Green Bay	March 17	Cable
March 12	Brookfield	March 18	Eau Claire
March 13	Barneveld	March 19	Tomah
March 16	Rhineland		

Chain Saw Safety, Maintenance, and Operation A repeat at two locations of the December workshop for those unable to attend due to class size limits or bad weather. Course includes personal protective equipment, proper maintenance, and the most effective chain saw techniques. A morning classroom session followed by an outdoor demonstration in the afternoon.

March 23	Wauwatosa	March 24	Barneveld
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Pavement Management for Local Roads This workshop is offered in two parts to meet a range of training needs for those using PASER and PASERWARE to implement pavement management. Part 1, the morning of March 16, covers the basics of pavement management, how to rate pavements using PASER, and an introduction to the logic of ROADWARE. Part 2, the afternoon of March 16 and the morning of March 17, includes demonstrations of PASERWARE 1.0 with an opportunity to try your hand in the computer lab testing various maintenance strategies by running simulations with several data bases, including your own if available. Register for part one, part two, or both as needed.

March 16 & 17, Madison

Asphalt Pavement Maintenance Demonstration A day of asphalt pavement maintenance demonstrations that begins with short presentations covering a variety of pavement maintenance techniques, followed by site visits to see those techniques being applied. You will see seal coats, crack seal, pothole patching

with the new spray patch machine, milling, and surface patches and overlays. The City of Monroe will host the demonstration in cooperation with the cities and counties of south central Wisconsin, Wisconsin Asphalt Pavers Association, Wisconsin DOT, Federal Highway Administration, and Transportation Information Center. Advance registration is required.

June 17, Monroe

UW-Madison Seminars

Local government officials are eligible for a limited number of scholarships for the following engineering courses in Madison. For details, use the form on page 7 for details, call 800/442-4615, or e-mail: ranum@engr.wisc.edu.

Environmental Impacts of Highway Projects, March 2-4

Managing the Development of Transportation Projects, March 12-13

Introduction to GPS, April 14-18

Traffic Engineering Fundamentals, April 21-23

Drainage System Design, April 27-30

Using HEC/RAS to Compute Water Surface Profiles, May 4-8

Fleet Maintenance Management, May 27-28

Other Training Opportunities

ITE Traffic Engineering in Small Communities Workshop, April 2 at the Marriott Hotel at I-94 and Blue Mound Road in Brookfield. For information call John Bieberitz of HNTB at 414-359-2300.

Controlling Erosion during Construction at five locations in Wisconsin. Includes current regulations, factors affecting erosion, ways to control erosion, and how to develop a site plan. Call UW CALS Outreach Services at (608) 262-5088 for more information and to register.

March 3	Rice Lake	March 17	Janesville
March 11	Minocqua	March 24	Sheboygan
March 12	Wausau		

Programs address speeding in residential areas

Madison's Speedwatch program is one of several city tools for addressing citizen concerns about speeding in their neighborhoods. It involves training residents to operate a speed display board on local streets. The board displays the legal limit and the actual travel speed of passing cars.

It's an educational tool for both drivers and residents, says Tom Walsh, a Madison Traffic Operations and Safety Engineer. Motorists usually slow down if they see that they are going faster than the speed limit. "It sends a message that real people are interested in the problem, and it makes a partnership with the community," he says. Walsh advocates a combination of engineering, education and enforcement to manage speeds.

About 24 neighborhood groups have set up a Speedwatch monitoring program, according to Walsh. Three to six volunteers are needed to staff the equipment. They are trained briefly on site and use the board several times during a week-long period. In some cases, police officers near the monitoring site will issue tickets to speeding motorists.

"The groups often don't continue after the first time," says Walsh. "Sometimes they learn that the problem is not as bad as they thought and some conclude that speeding is a problem with no easy solution." However, people benefit from discussing the problem, Walsh believes. And the program is a good tool to help educate the public about speeding.

Groups can also do a speed study by collecting data using the board and can take down license plate numbers. The police department writes the car owner a letter.

The newest style of monitor board is about the size of a small suitcase and plugs into a car's cigarette lighter. It has a changeable message board measuring 15 by 20 inches with numbers 12 inches high, and costs about \$3000 with a built in radar gun.



Monitor boards help make motorists aware of their speeding.

Another speed enforcement tool is the Speeding Hotline. People who observe speeders and get their license numbers can leave a recorded message on the hotline. The police department follows up with a letter. Madison is also beginning to install speed humps and traffic circles to curb speeds in residential neighborhoods.

"About 15 percent of drivers are habitually in excess of the speed limit," says Walsh, "and speeding is often a factor in crashes due to the inability to stop in time." Madison has about 5000 reported crashes that required police contact each year, and countless more that are not reported. Managing speeds can be an important tool for public safety.

For information about Madison's Speedwatch and other programs, contact Tom Walsh at 608/266-4761.

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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- My idea, comment or question is _____

(We'll contact you to get more details or answer your question.)

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Common aggregate types in the state and what to look for at the pit or quarry

See related story on page 3: Quick checks for aggregate quality.

Limestone, "lime rock" Eastern, southern, southwestern, and western Wisconsin

Look at the quarry face. Is it breaking down on its own? This indicates less stable, weaker rock. How thick are the layers? Very thin layers are usually shale which is undesirable. Is it highly fractured (vertical and horizontal cracks)? This, too, indicates weaker rock. The ideal face looks massive; stands hard and firm. Check for chert in the rock. Once exposed, chert— lighter, whitish lumps with very fine grain—tends to disintegrate. Less is better. What is the amount of fines in the rock? Lower grade limestone tends to have too many fines.

Disintegrated or "rotten" granite Central Wisconsin

Not the best material but widely used, according to Pfister How broken down is it? Are the pieces large enough to make good aggregate? The larger pieces should be at least the size of marbles. Can you break it up by hand? In use, rotten granite continues to break down. What is your past experience with the source? Is gradation even (a mixture of fine to coarse particles)? Look for coarser, larger individual crystals in rock pieces.

Quartzite, granite, crushed basalt, "trap rock" North central and northwestern Wisconsin with local occurrences in other areas

These igneous/ metamorphic rocks are hard and durable but asphalt tends to strip off and

leave aggregates exposed. It is difficult and expensive to crush. Check a sample that's been crushed. Most pieces should be blocky or irregularly shaped. It should not have too many flat, elongated splinters. Check for fines. All of these materials will probably be deficient, i.e. will provide good drainage but make it hard to obtain stability. Add sand and a little silt clay for binder.

Glacial gravels, "pit run", "bank run" North, central and southeastern Wisconsin

Look for stones larger than your desired final size because you must crush about half of them. Examine gradation. You want a good range of larger pieces, smaller pieces, and sand with just a hint of fine material. A dormant pit looks stonier than it is. Judge the quality from a fresh face.

How clean or dirty is it? Collect a handful of damp gravel and squeeze it. Good pit run gravel will leave your hand just slightly discolored. Gravel with too many fines will appear sticky and will leave your hand noticeably dirty.

Look for clay balls or lumps. Gravel with more clay is less desirable.

Are there many pieces of sandstone or chert? Too much means poorer quality. Sandstone breaks down physically and chert breaks down chemically. (This problem is especially common in the northern quarter of the state.)



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