

Planning, contracts can preserve urban trees

It takes decades to grow the mature trees that enhance the quality, value and environment of city neighborhoods. Yet many contractors and city officials accept construction damage as regrettable, but inevitable.

Not so, says Jim Kringer, forestry inspector for the City of Milwaukee. "When this program started, the City of Milwaukee was losing up to 400 trees annually. Now, we lose as few as two a year," he says. "We save 99 percent of the trees involved with city construction."

The key is making trees a priority with contractors by

- designing specs for protection;
- inspecting before, during and after projects; and
- assessing substantial fines for damage.

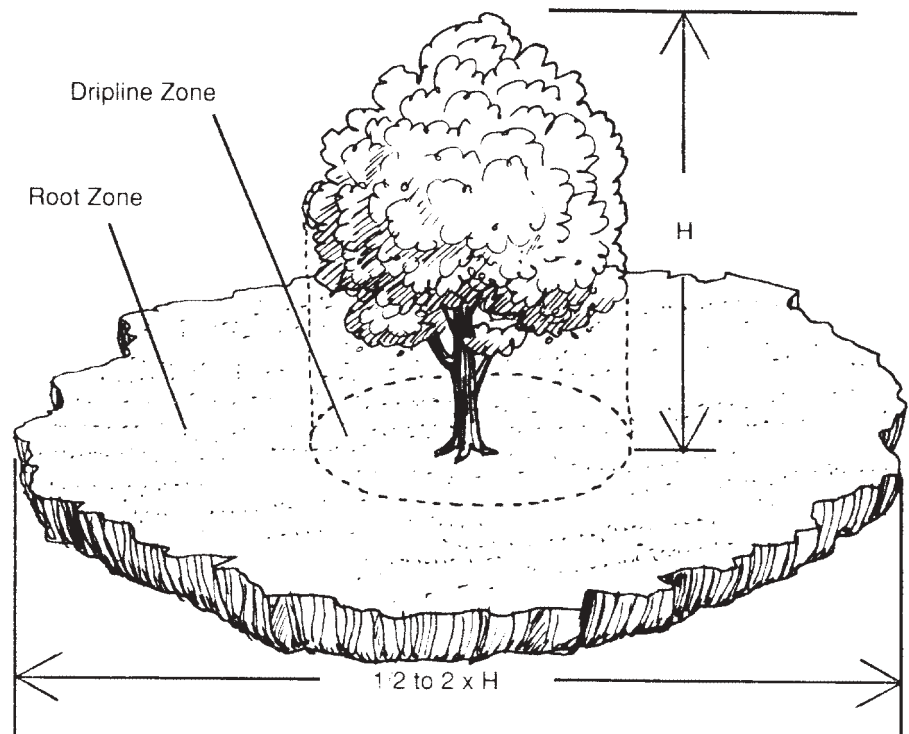
Milwaukee woke up the hard way in 1978 when contractors replaced sidewalks in a residential area with hundreds of mature trees. A storm came through that August and blew over 90 trees in the area because their support roots were cut. The aldermen demanded changes.



Construction practices killed this mature tree.

"They hired me in 1981 and told me to stop the trees from falling over," says Kringer. "We didn't know how, so for the first two years I just asked questions." He talked to contractors, and engineers, and equipment manufacturers. "Many didn't understand about trees and how they grow. They felt that trees could be hacked away or easily replaced to get the job done. We had to change that attitude," Kringer says. That was not easy.

Now, two decades later, the program successfully protects well over 300,000



Myths about trees cause problems. Most have shallow roots that spread well beyond the drip line.

trees using just two full-time employees. In fact, the sewerage district is proposing to double the number of trees in the city. It estimates that trees save \$21 million a year in runoff management by absorbing 15.5 million gallons of rainwater that would have to be processed through the storm sewer system.

How to save trees

Saving trees starts with the design phase. Kringer analyzes the site, its soils, and the tree types. He then works with designers and engineers to develop plans that protect the trees. "If a sidewalk is raised because a tree root grew under-



Protecting tree by arcing sidewalk.

neath it, we will change the summit of the walk so it gradually rises and falls over the root instead of cutting it out," Kringer says. They may also design an arc or even narrow the sidewalk or the roadway by up to a foot.

When tree roots must be cut, Kringer prescribes precise cuts with hand tools that minimize tree damage. "We do not allow mechanical root cutting because they can tear roots apart. Throughout construction we closely monitor where roots are. Our goal is not to disturb roots," Kringer says.

Once they understood the problem, sidewalk contractors helped. One redesigned the slipform machine used to pour curb and gutter. Instead of needing a foot of curb clearance, requiring workers to cut into the terrace and the brace roots of healthy trees, they rearranged the rear track and the curb mule so it now requires zero clearance.

Other actions also affect tree roots. Parking vehicles in the shade of a tree compacts the soil, so the tree can't soak up water and nutrients. Staging building materials under trees can suffocate roots, causing damage or death.

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Kringer lists tree challenges and suggested construction methods in the *Special Provisions* section of a job's specifications. Some measures are as simple as trimming overhanging branches ahead of a project and putting a \$15 exhaust diverter on equipment stacks to protect trees from hot gasses.

This section details hefty penalties if the contractor damages trees during the job. Contractors must consider these provisions as they prepare their bids. The fines reflect the lost value and the cost for tree repair or replacement and are deducted from the contractor payment.

"We estimate the insured value of a 30" diameter elm tree at \$20,000," says Kringer. The Common Council authorizes a charge of \$100 per diameter inch be assessed to the contractor if the tree needs to be removed. In addition, they are charged for removal.

"Even though a new tree planting may only cost \$400, the total replacement cost charged to the contractor can be as high as \$8,000," he says. Penalties for excessive root damage cost \$50 for every 2 inches of root stock that's damaged. For other damage, city crews cut back branches and take other repair actions also at the contractor's expense.

Once contractors' employees got skilled at working carefully around trees, the requirements added minimal time to getting the job done, Kringer says. "Contractors are more than willing to work along with you. Most live in the community and they realize the value of the trees," he says.

As the Milwaukee tree program shows, there's no reason to accept tree loss and damage as the cost of fixing streets and sidewalks.

For assistance in starting an urban tree management program, contact Jim Kringer at 414/708-2428 or jdean45@juno.com. Also see Resources on page 6 for publications and websites.

Calendar

T.I.C. Workshops

Specific details, locations and registration forms are sent to all Crossroads recipients prior to each workshop. Registration begins after announcements are sent.

Road Maintenance This workshop presents maintenance, repair and reconstruction options for your local roads and streets. Best practices for maintaining and improving drainage and extending pavement life. Includes exercises to help you decide which maintenance techniques are best for a particular situation.

| DATE | LOCATION |
|--------|------------|
| Mar 11 | Barneveld |
| Mar 12 | Brookfield |
| Mar 15 | DePere |
| Mar 16 | Rhineland |
| Mar 17 | Hayward |
| Mar 18 | Eau Claire |
| Mar 19 | Tomah |

Local Transportation Issues (WisLine)

The T.I.C. and UW Local Government Center present the following program at over 103 Wisconsin WisLine locations. Call 608/262-9960 or visit www.uwex.edu/lgc for more information.

Using Stone On Roadway Projects

March 4, 10:30 a.m.-12:20 p.m.

Stone—one of the most important and widespread building materials used in road construction and maintenance—is used as road base, as aggregate in asphaltic and Portland cement concrete, as shoulder surface material, as foundation and backfill for drainage pipes, and to fill undercuts in soft soils. Review the physical properties of stone, the tests used to classify it, and specifications for its many purposes.

On-site workshops

For fee information and to schedule an on-site training session call 800/442-4615, e-mail: tic@epd.engr.wisc.edu, or use the form on page 7.

Basic Surveying for Local Highway Departments



Learn to use a tape and hand level for fast and reliable measurements to lay out a building, set culvert and ditch grades, determine crown and slopes, and set construction stakes. This one-day workshop includes classroom instruction and outdoor field exercises. For highway workers and foreman with little or no surveying experience. *Maximum class of 20.*

Flagger Training This three-hour workshop provides solid flagger training for all your field personnel. It covers procedures approved for WisDOT construction, maintenance and utility flagging operations. All participants receive a flagger pocket guide and actually practice flagging.

Flagger Instructor Training For key staff who will be training new employees and temporary help, add this extra half-day workshop to the flagger training. Participants practice teaching the flagger training, and receive an instructor's manual, video, and a supply of flagger handbooks. *Class limited to 20.*

UW-Madison courses

Local government officials are eligible for a limited number of scholarships for the following Engineering Professional Development courses. Courses are in Madison unless otherwise noted.

Urban Street Design Mar 8-10

Bicycle and Pedestrian Facilities
Mar 10-11

Implementing a Sidewalk Management System Mar 15-16

Designing Best Management Practices for Stormwater Quality Improvement Mar 29-31

Using the Source Loading and Management Model for Stormwater Management Mar 31-Apr 2

Land Development Traffic Impact Analysis Apr 15-16

Geosynthetics for Beginners Apr 22-23

Municipal Engineering Fundamentals for Non-engineers Apr 22-23

Soil Engineering for Non-Soils Engineers and Technicians Apr 20-21

Effective Roadway Lighting Apr 26-28

Accessible Transportation May 3-5