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# RRIGATION: an athletic field necessity

by Ray Flood

■ Turf that provides athletes with a safe, playable surface must also look good. That can be difficult, especially with unfavorable weather, heavy play and tight budgets.

Irrigation should be an integral part of the basic field design. Even before the turf options are discussed, two questions should be answered: "Is water available?" and "How will watering be handled?"

Each athletic field has specific factors that must be considered in determining irrigation needs:

- typical weather patterns,

## The Ten (Plus One)

**I**

**Flow and psi.** Determine these figures for the water source.

**II**

**Sprinkler head layout.** Based on water availability, what type of head pattern and spacing best supplies water?

**III**

**Labels.** Label the sprinkler head arc and gpm (gallons of water which pass through the sprinkler head per minute). The arc describes the spray pattern and will indicate the height to which water is thrown and the distance of flow.

**IIII**

**Zoning.** Group heads into zones. The main water source supplies a set amount of gpm, for example 50 gpm. Each sprinkler head uses a set amount of gpm, for example 10 gpm. In this example, the maximum number of heads that could operate on a zone would be five (50 gpm ÷ 10 gpm = 5).

**IV**

**Main line.** Locate the system's main line. It always contains water under pressure and should be positioned to feed water most efficiently through lateral lines to the sprinkler head locations.

**V**

**Valves.** Spot them. Each zone off the main line has a valve between the main line piping and the piping that leads to the heads within that zone. A controller with a clock is used to trigger the valves. The controller could be mechanical, with dials and physical switches to trigger as the clock physically rotates, or electric, using electrical impulses to trigger activity.

**VI**

**Lateral piping.** Locate the lines that extend outward from the valves to the sprinkler heads. These lines usually use smaller pipe than the main line, becoming progressively smaller as they extend from the main line. Because water is released from the system at each sprinkler head, less pipe diameter is needed to transport the remaining water to the next head. Using progressively smaller pipe reduces system costs.

**VII**

**Friction loss.** Calculate the amount of pressure that is lost to friction as the water works its way through the piping to the last head in the zone. Water pressure affects sprinkler head performance.

**VIII**

**More labels.** Label all the components on the design and prepare a legend to identify them.

**IX**

**Water schedule.** Determine how quickly the field's soil absorbs water. Water should be delivered at, or slightly below, the soil's capacity to absorb it. Too much water at one time will either puddle or run off.

Turf water use is reflected by evapotranspiration (ET) rates. ET is the amount of evaporation caused by weather factors, combined with the transpiration rate of the specific grasses. Irrigation makes water available to the turf to make up for this water loss.

**X**

**Material.** Determine how much material to purchase in order to install the system. It's most efficient to install in-ground sprinkler systems before field construction. Installing later means you disrupt the soil profile and established turf, which may lead to uneven settling.

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✔soil type and absorption/drainage capacity,

✔desired turf varieties,

✔type and frequency of sports activities and

✔desired quality level.

The "Ten-Plus-One Commandments of Design" (as taught at the University of Maryland by the Professional School of Irrigation from Chantilly, Va.) lay the groundwork for installing a workable, in-ground sprinkler system or the basic considerations for an above-ground system.

Lay out the design on paper for accuracy.

Whichever in-ground system is installed, get a copy of the design ("as built" is the term designers use) to keep on hand in case of problems. Make sure at least one person on staff has a working knowledge of the system.

Whether installing a new in-ground system or upgrading an older one, take time to evaluate suppliers. Select a company that has the ability to analyze specific needs, design a

**Irrigation test during reconstruction of Rosenblatt Stadium, Omaha, Neb. Determine how quickly the field's soil absorbs water. Water should be delivered at, or slightly below, the soil's capacity to absorb it.**

## THE ULTIMATE IN-GROUND SYSTEMS...

✔...have controllers connected to a computer. Valves are operated by radio waves from the computer to radio antennae hooked to the controllers in the field. The computer's clock is the only one needed.

✔...are especially beneficial in multiple-field operations in which the one-time major investment is quickly paid back by the reduced hours spent on irrigation operation.

✔...almost think for themselves. New software programs allow the computer to adjust scheduling according to information supplied on variable conditions. Information can be gathered and typed in manually or fed to the computer from in-ground sensors located at strategic places in the fields.

*–R.F.*

suitable system within budget restraints, and provide the back-up service required. When considering system options, examine both long-range and short-term cost-to-efficiency ratios. Irrigation systems should make turf maintenance easier and more effective—not add to the turf manager's workload.

*—The author is commercial sales representative for Turf Equipment and Supply Co., Baltimore, Md., and an active member of the Sports Turf Managers Association.*

## ABOVE-GROUND SYSTEMS

■ If an in-ground system is too costly, steps *Plus 1-1-2-3-7-9-10* will help in pre-planning an above-ground system.

Options include:

- a manual system with a network of above-ground hoses and impact heads;
- travelling sprinklers; or
- a semi-automatic system using a retractable tripod-based sprinkler head run off 1 1/2- to 2-inch hose.

For in-ground installations, manufacturers offer heads designed for athletic field safety. When properly installed, these heads become a non-factor during play. The valves for athletic field irrigation should be positioned off to the side of the field for further safety.

- A basic in-ground sprinkler system could be manually operated. Gate valves—which are similar to the water outlet valves outside a home—on the main and lateral lines give immediate on-off response.
- To cut costs, quick-connect valves can be used in lieu of sprinkler heads, with a limited number of heads purchased to move from zone to zone for watering.
- A typical electronic system would use all electronic controllers to operate the system on a prearranged schedule with a manual override. Electronic systems nearly always operate with valves that remain closed unless electronically opened to prevent systems from turning on during electrical outages.
- Another mid-range system operates using hydraulics, with an electronic controller and tiny tubes of water channeled to and from each valve.

*—R.F.*

# Stump cutter maintenance

**Preventive maintenance helps keep them productive, expert Brad Yochheim says.**

by James E. Guyette

■ When operating a stump cutter, you need to pay extra attention to preventive maintenance.

"A stump cutter is a very powerful and productive machine when used properly," explains Brad Yochheim of Rayco Inc., Wooster, Ohio. "However, when improperly operated, a stump cutter can prove dangerous to the operators as well as onlookers."

Stump cutters need a detailed inspection program before and during operation. "Make sure all necessary guards are in their proper places and functioning correctly," Yochheim urges. "Use extra guards such as plywood or canvas curtains when operating near houses, windows, roadsides and other public places."

The stump and surrounding areas should be clear of rocks, metal objects and utility lines. If you are unsure about utility lines, call the utility company to locate the lines for you, or you could end up paying any repair bills.

**Engine hints**—"The engine is the most expensive part of the machine to replace, so religious maintenance on it will be very beneficial in the long run," says Yochheim.

Check and clean the **air filter** at least once a day because of the dusty environment the engine is exposed to.

"The air filter should be taken out and tapped on the sides to get rid of the dirt. It should not be blown out with an air hose."

The engine **cooling fins** should be cleaned at least once a week (to prevent build-up of dirt, wood chips and other debris with an air hose.

"It is very important that the engine's **oil** be checked and changed as recommended by each manufacturer," says Yochheim. "Be sure not to skimp on engine oil quality."

Check and heed your manual's advice on the break-in time needed for the oil and filters on a new machine.

"The **spark plugs** should be checked periodically and re-gapped when necessary. Wisconsin recommends that you replace the plugs after every 350 hours of operation; Kohler recommends 100 hours," Yochheim says.

On all engines, the **fuel** tank should be drained once a month to get rid of debris and sediment, and reduce sludge build-up. Each day, the **fuel line** should be checked to insure that it is not kinked or cut. Replace the **fuel filter** accordingly.

**Hydraulic systems**—Be sure the **hydraulic system oil** level is checked daily. A low oil level will result in sluggish hydraulic cylinder performance. "The hydraulic oil should be changed once a year, every 500 hours, or sooner, if it is noticeably dirty or smells burnt," Yochheim says. On a newer hydrostatic drive, the oil filter should be changed once a month and the oil should be changed once a year.

The **hydraulic oil filter** should be replaced after a 10-hour break-in period and every 250 hours thereafter.

All **bearings**, such as the cutter wheel bearings and jackshaft bearings, should be greased with a hand-held grease gun daily. "An air-type grease gun should not be used so as *not* to blow the seals out of the bearings," Yochheim notes.

**Belts, etc.**—All of the **pivot pins** (cylinder ends, king pins, hinge pins, etc.) should be greased once a week or after 10 hours of operation.

**Belt guards**, **chain guards** and **rubber curtains** should all be checked daily for loose belts or worn parts.

"The drive system on your stump cutter is composed of V-belts and/or a steel roller chain—or, on newer models, a polychain," Yochheim explains. "A faulty drive system will result in loss of power and productivity."

The stump cutter's **V-belts** should be checked daily for tension. Yochheim says that you should be able to depress one belt thickness in the center of the belt span when the belt is engaged. Check the manual for adjustment tips.

"If the belts are constantly screaming—or loss of power is experienced—the **sheaves** on the end of the belt drive should be checked for wear," he advises. "Usually, the sheave at the engine shaft will wear first." Also, make sure there's no debris on the sheaves or belt path.

The **steel roller chain** or **polychain** should be checked periodically for proper tension and wear. The **chain housing** should be thoroughly cleaned of wood chips, dirt and other debris. Check for sprocket wear, too.

Yochheim says that a steel roller chain needs proper lubrication to function efficiently. The most important part of using a polychain is making sure that it is correctly aligned on the sprockets, or it will wear out sooner.

A stump cutter's **teeth** are the biggest wear item, says Yochheim. "These should be inspected for wear or damage almost every hour," he says.

*—James E. Guyette is a freelance writer who specializes in the green industry. He is based in South Euclid, Ohio.*

## DOs, DON'Ts

**DO:**

- ✓ Watch for people not in safety zone.
- ✓ Wear all proper safety gear.
- ✓ Make sure all guards are in place properly.
- ✓ Use extra guards in populated areas.
- ✓ Inspect stump and area for rocks, metal, etc.
- ✓ Use air hose to clean engine fins weekly.
- ✓ Check, replace oil frequently.
- ✓ Replace, gap spark plugs when needed.
- ✓ Drain fuel tank monthly.
- ✓ Check hydraulic oil daily.
- ✓ Grease bearings daily.
- ✓ Grease pivot points often.
- ✓ Check V-belts, sheaves, chains, sprockets.
- ✓ Check teeth almost hourly.
- ✓ Secure trailer hitch properly.

**DON'T:**

- x Walk near turning cutter wheel.
- x Grind near unverified utility lines.
- x Use an air hose to clean air filter.
- x Skimp on oil quality.
- x Use air-type grease gun.
- x Gnaw at stump with dull teeth.
- x Haul stump cutter with undersized truck.

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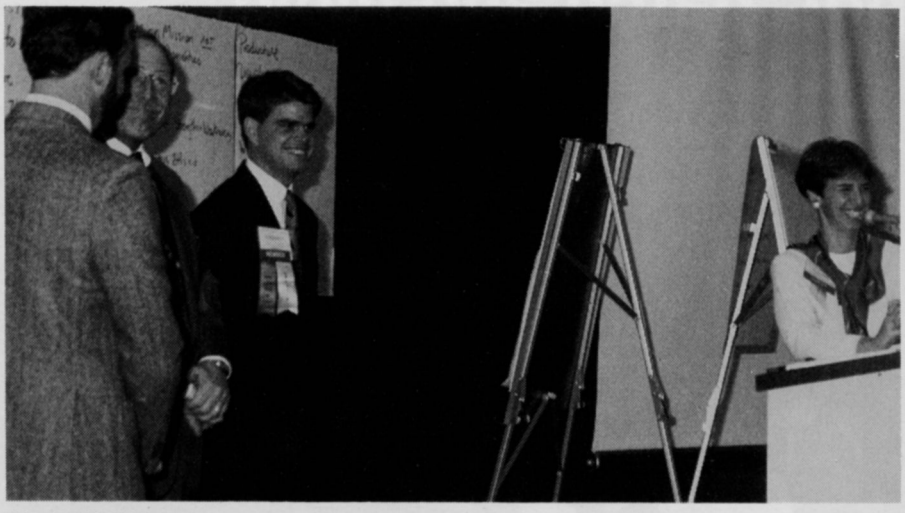


**Linda Wolff Reed, extreme right, uses ALCA members to demonstrate how great teams can be different because people are different.**

# *Building a team:* Maybe the most important thing you'll ever have to do

**People who complement each other and know how to work together make a great team.**

■ "You must create the magic that makes a team work," says Linda Wolff Reed, an organizational development consultant based in Portland, Ore.

"Every employee must know the company's mission," she says. "The company's goal is the common goal. There is no other agenda. But don't get so over-committed to accomplishing the goal—the end result—that you don't focus on the process.

"I look at a team as the entire company. If the employee sees him or herself as working for one person, the team concept won't work," she says.

Communicating with employees is the first step in building a winning team. "It's the first step in creating trust," Reed continues. "Eighty percent of communications is listening."

She says the key to establishing trust is DWYSYWD: "'Do What You Say You Will Do:' your actions must follow your words."

Reed suggests you ask employees for written responses to these questions:

**1)** If you could change two things in this company, what would they be?

**2)** Do you really think the company listens to you? How?

**3)** What two things do you like most about the company?

**4)** What resources are here that we're not using?

**5)** How are we at recognition?

**6)** What should the company do this year?

"Not a lot will change in the first year, except that you'll build trust," says Reed. "Tell your people what you learned, how you're going to accomplish it, and what role they will play. And putting it into writing to your employees makes you accountable.

"As people see targets developing, the trust is created. But they will hold you accountable, and it is not fun."

Finding leaders is the next step in creating a winning team.

"In any given situation, anyone can be a leader," Reed notes. "Leadership qualities have been over-emphasized. In a team, the pieces all fit, so you must first find out people's strengths."

Look past what might be negative conations, or instincts, in a team player, she says. Look to the positive. "When you're building on strengths, there are no weaknesses."

According to Reed, there are four forces that drive the actions of employees:

**1)** The instinct to **probe**, to ask why. This kind of employee might always be argumentative, but he or she is also an answer-finder.

**2)** The instinct to **pattern**, a person who is driven to completion. Though this kind of employee won't deviate from a pattern, he or she sees the "big picture."

**3)** The instinct to **innovate;** to ask "what if." Though this type of employee might be entirely too impulsive, you can depend on him or her in a crisis.

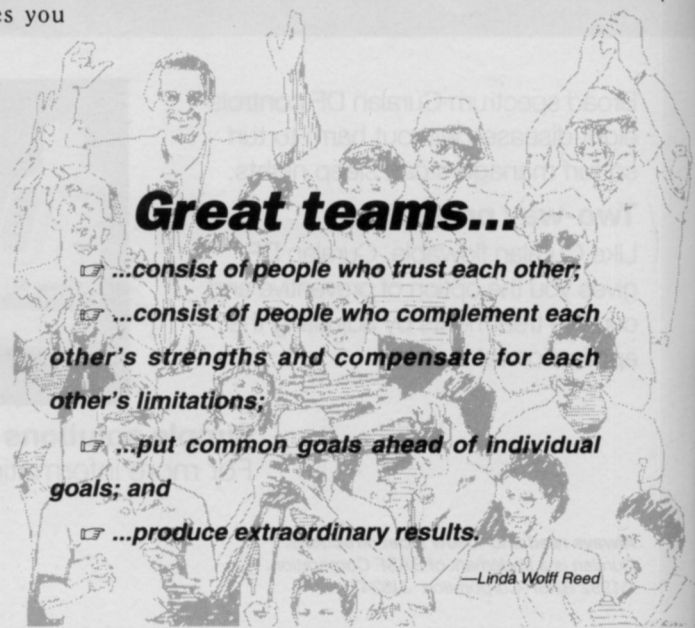
**4)** The instinct to be **physically demonstrative**. While this employee might be noncommunicative, he or she can show you how to more efficiently perform physical tasks.

"The respecting of differences is the way to accomplish trust and strengthen one another," Reed observes. "Respecting differences is the most difficult thing we have to do as human beings. Our society is very individualistic. So if the leader is unwilling to respect differences, no one else on the team will."

What happens with a good team? Synergy—the sum of all the talents you have assembled is greater than its parts. And that should be the goal of your team-building process.

Reed made her observations at the Associated Landscape Contractors of America's annual conference last November in Indianapolis.

*—Jerry Roche*



## *Great teams...*

☞ ***...consist of people who trust each other;***

☞ ***...consist of people who complement each other's strengths and compensate for each other's limitations;***

☞ ***...put common goals ahead of individual goals; and***

☞ ***...produce extraordinary results.***

*—Linda Wolff Reed*

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# HANG TEN

# Fertilizing woody landscape plants

**Proper technique and fertilizer selection are parts of PHC over which arborists have more control than any other service except tree pruning and surgery.**

by Trevor F. Vidic
The Davey Tree Expert Co.

■ Maintaining woody plants in artificial ecosystems such as landscapes is a manipulative science.

Landscape soil usually does not contain the natural nutrients that are found in most wild plant communities. Arborists can use fertilizers to replace these essential elements, which plants need for optimum growth.

Providing nutrients for plants' roots and surrounding soil is probably the most important Plant Health Care (PHC) treatment arborists provide. The Davey Tree Expert Co. and the International Society of Arboriculture are among the industry organizations that endorse and employ PHC. Its strategy focuses on maintaining healthy, vital plants to enhance plants' natural defense systems, minimizing pesticide use.

The best way to promote plant health is proper site and plant selection, planting techniques and cultural maintenance. The right tree in the right soil with a good mulch, watering and fertilization program will function and grow with minimum pest problems.

The ISA notes that woody plant fertilization can increase growth, reduce pest susceptibility, and sometimes help reverse declining health. Fertilizer misuse, however, may not benefit woody plants at all, and in some cases it actually damages them.

Large, over-mature trees may not need fertilization, for example, and over-application of soluble nitrogen may trigger unnecessary growth that is susceptible to insect and disease attack. Over-fertilized trees often need more pruning at shorter intervals to control or direct vigorous growth that the plant's root system may not be able to sustain. High salt, high nitrogen tree fertilizers also can induce plasmolysis (water loss from root cells) and decrease mycorrhizal populations, the association between roots and certain fungi that improves absorption.

**Why nutrients?**—Good fertilizers and application technique, while promoting the growth plants need to survive, should also provide nutrients that are necessary for the plant to maintain its structure and function.

All organisms require at least 16 essential elements. Of the 16, bonded carbon, hydrogen and oxygen are the energy-yielding carbohydrates or "tree food" derived from photosynthesis. The other 13 elements are absorbed from the soil as cations and anions.

A fertilizer itself in the soil is not a nutrient. Instead, it is a group of essential elements that will be used as nutrients through the interaction of the plant and soil. Fertilizing a tree is not the same as "energizing" a tree; fertilization simply provides some of the essential elements to the soil that the tree takes in for its own energy system.

An important aspect of woody plant fertilization is the method used to deliver essential elements to the root system. According to Dr. Roger Funk of the Davey Institute, the most limiting factor in fertilizer uptake is water availability. The ISA has studies on mature trees that demonstrate optimal response to fertilization in areas with relatively high soil moisture levels.

**The entire area within, to several feet beyond, the drip line should be fertilized.** *(Photo courtesy Davey Tree Expert Co.)*

In addition to water, application frequency depends on type of material used, the soil profile, plant species and periods of root growth. With these variables taken into account—balanced by the economic realities of arborists being able to apply an appropriate material in a wide range of soil environments and climates during growing and dormant seasons—Dr. Funk developed a complete, slow-release, low-salt fertilizer that is applied with the liquid injection method.

**Liquid injection**—Of the five general

*continued on page 34*