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Remember the great musical, Camelot, by Rodgers and Hammerstein? The beginning of the story tells of happiness, merriment, eternal springtime and perfection. Remember one of the central images of the legend of King Arthur and the Round Table?

What springs to mind about the round table is equality, lawfulness, keen listening to the contributions of others, the well-being of all people, the best of the best, and a place where new ideas are treasured. Imagine creating a society or a workplace on these principles.

Can you guess what the most popular dining table choice is for families? A round table! According to a recent article in the San Antonio Express-News, informality has transformed home furnishings. John Pile, a professor of design at Pratt Institute, says, “The formality of a patriarchal society has vanished in the 1990s. The idea that Papa sits at one end and Mama at the other is no longer the norm of family life.”

Michael Delgaudio, a vice president at Century Furniture, supports that “round is more pleasing. There is something less pretentious about it.”

In other words, the home and family is the first place we learn the true messages of a team and responsibility to each other, but it’s also the first place we learn the value of diversity and open communication.

Let’s take a walk around our offices and see what subtle messages we are sending in our set-ups. Stop for a moment and look around. Maybe the message is, “find a spot to perch if you can, just move a few stacks of paper off that chair.”

If you have a room to eat lunch in or have meetings with your staff, where do you sit? Do you have a head of the table for meetings? If you’re the owner, do you always sit there or do other staff members chair meetings and sit in the “head” seat? Or, do you have a round table?

If someone comes in to see us, and it is going to be a tough conversation, do we go around the other side of our desks to sit with them? Or do we stay behind our desks, which create barriers to open communication? Do we ever just get rid of the furniture in the room and sit down on the floor together—at the same level in the same informal position? Ever sit on the tailgate with your crews, or the ground, and just chat? Do the people with the windows have seniority or are they your most productive people. Does your office group people together in logical clusters of work teams to promote creativity?

We don’t have to have round tables, but we can create a figurative round table. Please let us know how your company is going about creating its version of Camelot in the workplace. We would like to share your success stories of innovative work environments.

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By Dr. Ed Gilman

What’s New in Chippers?
By Thomas G. Dolan

Nightmare on Elm Street
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Chain Saw Safety & Use

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Beyond Deadwooding

By Ed Gilman

Large diameter, low branches are beginning to get in the way of cars and pedestrians.

A tree makes a living through photosynthesis. It produces sugars and glucose, which are then translocated through the phloem up and down the plant and are stored in the "rays." When we injure that tree with a bulldozer, flush cut or by taking off a co-dominant stem, we set in motion a course of events known as "compartmentalization of decay."

An injured tree develops a reaction wall called "wall four," which is a boundary layer formed along the cambium under the bark. That wall or zone could completely encircle the plant over the course of a few years after the injury. The wall traps all the carbohydrates that the plant has spent precious years developing and storing within the ray cells of the affected portion of the trunk. A tree traps all that stored energy to prevent decay from moving out into the new growth that occurs after the injury.

That is a quick, one-hour biology lesson squeezed into two paragraphs.

Tree biology is extremely important in understanding pruning, because as we injure trees by taking off co-dominant stems, hitting them with a bulldozer or making flush cuts, we set into motion the development of this wall four that traps carbohydrates inside the center of the tree. They are unable to come out to the phloem to be used for other parts of the plant. This is one reason why injured trees have such a tough time in drought years. They are unable to use the stored carbohydrates to put out new root growth, buds and foliage.

Managing trees in urban landscapes through pruning

When trees first evolved in the forest, their stems grew close together. With the exception of some understory plants, forest trees have one stem, and the canopy is up near the top of the plant. There are co-dominant stems, or large diameter branches, near the top. The bottom half of the tree is either clear of branches or consists of small branches. Trees grow...
that way in the forest because the only light is from above; therefore, they only grow in one direction—up. When trees grow in the forest, lower branches usually stay relatively small, compared to the trunk.

“Relatively small, compared to the trunk” is a key phrase when it comes to pruning. When the branch stays small relative to the size of the trunk, there is a swollen area at the base of each branch, called a branch collar. As the size of that branch increases relative to the trunk and becomes a co-dominant or equally sized leader, the collar disappears. If you were to remove one side or the other, there is no place to guide you in terms of a collar.

The presence of included bark forces us to offer remedial treatments, such as cabling. This is a fine service and one we should continue to offer. Many arborists have become experts at cabling and bracing trees together. I would like to focus on a more long-term approach to prevent trees from growing into this problem. Long-term thinking won’t change the urban landscape overnight, however. Some of your high-end clients will accept a preventive approach. Sustainability is one way to characterize this attitude.

A typical plant from a nursery might have three co-dominant stems. When that tree is planted in a landscape, typically 30 to 50 feet apart in parks, along streets, or singly at home sites, light reaches the plant from all directions. With plenty of light, the
trees like spruce, fir and some eucalyptus. Twenty to 50 years later, the plant seems to be functioning in the landscape. A closer inspection might reveal included bark and cracks in the trunk.

Raising trees is like raising children. If you abandon a child for 20 years, would you be surprised if that child was in jail when you came back? If you abandon a tree for 20 years, you will also be in trouble. It takes about 25 years to raise a tree, about as long as it takes to raise a child. You can try to get that tree out of “jail” (through cabling and bracing), but there are better ways to prevent problems.

1. Problem number one is the development of co-dominant stems, leading to included bark or not, and then tree failure. In storms, trees with co-dominant stems can break out—even those without included bark. You do not need included bark as part of the condition of tree failure.

A co-dominant stem is defined as a limb that is over one-half the diameter of the trunk. When that limb is greater than about one-half the diameter, it doesn’t have a structure inside the base of the branch that protects the trunk from decay. Since there is no branch protection zone at the base of a co-dominant stem, you invite decay in the trunk when you take off a branch or stem of this size.

Decay can set in and move very quickly in some species. To give you an idea of how fast decay can move in a stem, we dissected a Shumard oak that was topped a number of years ago. Vigorous sprouts were growing from the top. We cut the tree trunk up into sections and found a brown line—a wall four—and a discolored area all through the center down to the root system.

After a tree is topped, the carbohydrates trapped inside can’t get across. Wall four prevents decay and discoloration from moving into the new growth, but all the existing growth at the time that tree was topped is now susceptible to decay. All the carbohydrates trapped behind a wall four are unavailable to the plant. They are available, however, to decay fungi. The tree can’t use it, but decay fungi can.

2. Problem number two is the development of low co-dominant stems. Eventually, we will be asked to raise the canopy by taking off low co-dominant stems. When a co-dominant is taken off, you could see die back to some degree below the area you removed. And we could initiate decay in the trunk.

Over-thinning

Taking out the inner foliage and leaving the outer foliage is improper thinning. When you strip out the inside, you encourage the tree to grow very long branches without much taper. This increases the likelihood of branch breakage. You will also get sprouting on many species. Stripping will ensure work, because you will be coming back to that tree year after year to remove sprouts.

Appropriate thinning seeks to minimize storm damage by creating holes in the outer portion of the canopy. Thin a tree by working only out on the edge, so that interior branches can gain light. Some people refer to this as working in the leafy area of the canopy. The interior leaves are very active on the tree—and they do much of the photosynthesis, which produces energy for the tree.

Selective pruning

As industry professionals, we have a very good understanding of where to make individual cuts and how to take an individual branch off of a tree. We understand the need to cut outside the collar (if there is one). However, we do not understand the important part quite as well—which branches to take.

A thinning cut takes a side branch off back to the collar, leaving the trunk. It leaves the swollen collar area alone.

A heading cut, on the other hand, cuts indiscriminately anywhere along the plant with no regard to other branches. This type of cut is all right for training young nursery trees smaller than two inches in diameter, but in most instances is inappropriate on bigger trees.

The third type of cut is a drop crotch cut, which is really a form of heading cut.
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Cut (subordinate) upright stems back to lateral branches so only one dominant leader develops into one trunk. Trees pruned every year or two can be lightly pruned. Those pruned less often may benefit from a moderate amount of pruning.

Let's run quickly through a thinning cut. After first taking the weight off the end, we cut just outside the collar. At the base of the branch is a protection zone, or an area that prevents decay from going back into the trunk. You do not want to cut into the trunk tissue. Note: See photograph on page 16 of the protection zone on the small diameter branch and no zone on the larger branch.

On small branches and young trees, proper cuts are usually round. They are oval sometimes on larger branches. You can teach yourself and your crews about proper pruning by returning a year later to see if the cut has developed circular callus or woundwood. If the cut has developed an elongated callus or woundwood, you are probably making flush cuts. A tree takes some of the carbohydrates in that zone and creates phenols and terpenes, depending on whether it is a hardwood or conifer. These are anti-microbial compounds that help stop the spread of decay.

When we have co-dominant stems, however, there is nothing but a weak wall preventing the decay from going back into the trunk.

As I noted earlier, most arborists have learned these lessons and become proficient at making thinning cuts on smaller branches. The difficulties come from pruning co-dominant stems.

Prevention of low co-dominant stems

What can we do with a typical young to medium-aged tree, 15 to 30 feet tall, with three low co-dominant stems developing? [See illustrations above.] If we let this tree go, we may have problems down the road. Instead, we can make some simple cuts to minimize the growth rate on two of those three branches. How do we minimize or slow down the growth rate on a branch? Prune it. Pruning is a growth-reduction process; it does not stimulate growth on the cut portion of the
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Reduce the growth rate on lower branches if they will need to be pruned later. This minimizes the size of the trunk wound once the branch is removed and helps prevent decay from entering the trunk.

Subordinate lower aggressive branches $a_1$, $a_2$, $b_1$, and $b_2$. Subordinate branch $c$, because it will compete with the leader, $d$. Branches $a$ and $b$ can be removed in a subsequent year, if needed.

Removing only the three lower branches leaves large pruning wounds, which could initiate trunk decay. The tree also looks very pruned.

tree. If you prune or remove secondary branches or branches from a branch, that branch will slow its growth rate.

By slowing the growth rate on two of the three branches, you push more growth into the stem you did not cut. In essence, we are trying to mimic what occurs in the forest by growing a taller tree with a dominant leader. We don’t want low branches developing into aggressive co-dominant branches, which is a very unnatural form. Many trees are not well equipped to deal with open growth form. We have to help them out.

If we do not prune this tree, in ten years the lowest branches may be growing close to the ground. We will be called in to raise the canopy. Removing these now co-dominant stems would leave big wounds with no protection zone—inviting the possibility of decay into the trunk.

Why wait until a branch grows to the point where it will become a co-dominant stem (with no protection zone)? Let’s think ahead, be proactive and slow it down now, removing some of its foliage. It will remain small because you have pruned it.

The solution is not to cut off these low co-dominant stems when the tree is young to medium aged. If we remove them altogether, there would not be much tree left and you probably would not get invited back again. Instead, prune secondary branches from the co-dominant stems two or three times over ten years. This will slow their growth and encourage the tree to grow taller. In several years when the main trunk of the tree has developed, remove these lower branches, if needed. By this point, they will no longer be large enough to be considered co-dominant and a branch protection zone is likely to have developed at the base. It will be easier for the tree to defend against the cut. This long-term approach is best for the tree.
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Removing branches that are large compared to the size of the trunk can initiate trunk decay (right) compared to removing small branches (left). It is better to remove a large branch over a period of years rather than all at once. (See illustration two for this procedure.)

Stay connected
The strongest connections in a tree are small diameter branches without included bark. The next strongest are co-dominant stems. The worst—and certainly, the weakest—attachments are co-dominant stems with included bark in the crotches.

tree looks less pruned when you work on it, and you are offering a regular service that is probably unmatched by your competition. See illustrations above.

Instead of cutting off a co-dominant stem, subordinate it. Make some drop crotch cuts out at the end, and maybe some thinning cuts, to reduce the weight and prepare that branch for eventual removal some time in the future. Some arborists understand and employ subordination; others don’t buy it. I understand that; I didn’t buy it the first time either. However, we have been doing this for six or seven years and we know it works.

This is the concept. Visualize a small tree 12 to 15 feet tall with three co-dominant stems. Ten to 20 years later, you will probably have included bark, drooping branches and three big co-dominant stems. The customer wants the canopy lifted. To prevent this, and to prevent the development of included bark and co-dominant limbs up in the canopy, we don’t want these low limbs to become permanent and grow up into the tree. They are simply too low on the plant.

Cut back with a light pruning or a light dose. You manage two things with type of pruning—growth rate, because cutting slows the growth rate on the cut stems—and light.

By removing upright branches on the stem we want to slow down, we allow others higher in the tree to grow because they are now open to light.

When you think you are finished with this pruning, walk around the tree about as far from the trunk as the tree is tall. You should be able to see the leader from 360 degrees around the plant. If foliage is blocking your view of the leader, remove some of that foliage by pruning more upright branches.

In this process, you always have to establish your objectives. Who is your client and what are your objectives? If you have a client who is willing to pay you to come back every year to work on a tree, you can be a lot less aggressive in your pruning. But if you work for a municipality and you think you can only get to this tree every five to ten years, you will have to take off more.

What I have described here is what happens in the forest all the time. We are just trying to work with nature by managing light and growth rate. This way, we can help prevent decay from taking mature trees and make them less susceptible to storm damage.

Dr. Ed Gilman is a professor in the Environmental Horticulture Department at the University of Florida.
Training,
What Is It?

By: Jeffrey Lee, Branch Management, Riverside, CA (909) 276-8060

Training employees can seem like an endless stream of “Geez, we’ve covered this a million times!” or even, “I don’t have the time to train today!” But, picture yourself driving down the road (at a modest rate of speed) when a car zips past. You glance over to see a driver with his faithful canine companion sitting in the back seat. The window is open just enough for the dog to stick his head out and catch the passing breeze. His eyelids are blown back so far that the whites of his eyes are exposed on all sides. The nostrils of his moist, black nose are flared like hanger gates. Ears flapping and popping. His mouth is wide open, and his tongue is flailing over his shoulder like a wind sock at the local airport!

This dog is the picture of total and complete happiness. Every sense is stimulated at a rate impossible under normal circumstances. Sense of speed, smell and even his taste buds are being pelted with new information as the car cruises down the highway. In this scenario, the mundane task of driving from one place to another has been transformed from a commonplace occurrence to a totally life-changing event for our canine pal. From this point on, whenever those car doors open, that dog will be there, ready to do it again - guaranteed.

Training is really quite similar to driving down the highway. For those in management, there are literally hundreds of ways to put yourself in that “driver’s seat.” The trick is to remember that with new or even seasoned employees, there is an unbelievable value in the excitement a person gets when something new is learned—and that value is not limited to just the “person” in the back seat.

Supervision - The time it takes to keep an eye on an untrained person will suck the life out of any job, but a well-trained individual will develop self-confidence and require little “babysitting.”

Safety - Everyone wants to do a good and safe job. However, this can be difficult if one doesn’t understand the complexities of the task. Training a person from the beginning will create a learning environment where questions of judgment will not be withheld and ultimately, a safe working environment will be the natural result.

Loyalty - Once an employee’s “journey” through the world of arboriculture has begun, the extra effort in opening the “window” of learning is an excellent step to retaining valued employees. As the example of the motorist and his canine friend illustrates, employees will be eager to go along for the ride.
Learning From Hiring Mistakes

By Wayne Outlaw

Losing an employee is never easy. If the employee is a high-performer, there is the obvious loss of productivity and capability in the field. If the employee is a poor performer, there is management's loss of effort, frustration, stress and the negative effect on other employees. The loss of high and poor performers impacts customer service and drains bottom-line profits, but for different reasons.

When the employee’s departure comes a few months after being hired, you naturally ask, “How could this have been prevented?” To answer this question, begin by carefully examining how the individual was hired. Many times mistakes were made and tough questions went unanswered. To reduce future turnover, there must be “no compromises” in hiring.

Had you clearly defined the position?

Begin your examination to determine what caused this termination by making sure you clearly knew what skills were needed for the position. Had you clearly defined the duties, responsibilities, expected level of performance, compensation, and career growth potential of the position? Was it clear to you and to others who interviewed the individual?

Did the candidate fully understand the position before accepting it?

Having a clear understanding of the position and, most importantly, what I call a “realistic job perspective” before making the commitment to join the company is obviously important. Not everything about a job is positive, and it is best if candidates understand the frustrations, difficulties, and problems they will encounter before accepting the position. Having this realistic understanding beforehand can go a long way in helping to eliminate or reduce disillusionment when inevitable problems or difficulties occur.

Did you clearly know the values, attitudes, and capabilities needed to be successful in the job?

With entry-level jobs such a brush dragger, physical capabilities such as strength, as well as basic knowledge and skills, may be foremost. However, higher level positions, such as foreman, crew leader or possibly sales, involve working with others. Supervisory positions require people and problem-solving skills. Were the attributes needed for success clearly defined?

There are many attributes required for success in positions, such as sales, that are not easily quantified. Age, education and industry experience may not be good indications of the ability to be successful. A climber with ten years of experience in trees may not possess the invisible characteristics needed to succeed in sales. You must be able to assess a candidate’s ability to endure rejection, goal focus or a drive for results—characteristics that make up the attributes needed for success in certain sales positions. These attributes even vary between sales positions in the same company. A person with the attributes of strong drive and competitiveness to opening new accounts may not have the patience and attention to detail needed to manage a major existing account.

How well did the individual match attributes needed for position?

Many times very capable and highly motivated individuals fail not because of a lack of effort or overall ability, but because their capability or attributes do not match the needs of the position. The better the candidate fits the position, the more successful he or she will be. The less an individual fits the position, the more management has to do in terms of training, developing and managing. If the fit or match is poor, management may not be able to do enough.

Did you interview and examine past performance thoroughly?

Past performance is the best indication of future performance, because behavioral patterns tend to repeat themselves. If an individual performed poorly and did not stay long in previous positions, future performance will continue about the same—no matter how well he or she presents himself or herself in the interview. Dramatic changes in performance do occur occasionally, but they are usually brought on by a significant, life-changing event.

Today, unfortunately, many applicants are becoming better at interviewing than the interviewer. To avoid being misled, use multiple interviews by multiple managers, and, if possible, on multiple days. Did the person who left have multiple in-depth interviews to uncover true past performance?

It may be tempting to try to convince yourself that with today’s tight labor market, you can’t afford to take this much time because the applicant will get a job somewhere else first. Recently, a manager for a company that just opened an operation in my hometown related that for one position...
they attracted 175 applicants, most of whom were experienced, to fill 40 jobs. Those who passed the initial screening interview came back for another interview and battery of tests. The survivors then interviewed with three different managers. A total of five interviews and a battery of tests may sound like a lot of time and effort, however, with this company it results in one of the highest levels of customer service and lowest levels of turnover in the restaurant industry. Every effort was made to ensure there were no compromises. Instead of turning applicants off, the effort expended made the job and company even more attractive to the employees.

Did you verify the individual’s background and performance thoroughly?

Even multiple interviews can’t uncover every potential problem. Use thorough and comprehensive reference checks to verify the performance claimed by the candidate during the interview. Get beyond the several handpicked references who say only good things and never mention the real problems. Was the individual’s performance verified with supervisors at each of their previous positions? Confirm credentials, such as education and certifications, by asking for or obtaining tangible proof. Conduct felony conviction checks and, if required, drug tests and physicals. Ensure all red flags are clarified fully to eliminate potential negligent hiring claims.

Did you complete the hiring process fully before making your decision?

Did you check to be sure everything had been done and no steps omitted, such as reference checks? Don’t allow yourself to make a decision until everything has been done. If you have already made up your mind to hire an individual, you may overlook or rationalize problems, especially during verification or reference checking, that may later turn out to be tell-tale indications of a situation or problem that will come back to haunt.

Did you ensure there were no compromises?

When I talk to managers about why an employee was lost, especially due to poor performance, usually it is not a surprise because they had a question or concern about hiring them in the first place. If there is any question or concern, the answer to the hiring question needs to be “no.”

When you look at how much effort it takes to orient employees, acclimate them to the organization, train and develop the specific skills needed, and manage their performance, it is not wise to compromise in hiring. To find out if you are compromising ask, “Do I feel comfortable trusting the candidate to pay my salary?” If not, pass and spend time finding more candidates. In reality, those we hire, indirectly, pay our salaries and pave the way for our future with their performance.

The better job you do of hiring, the easier it will be to train and manage the employee. Learn from those who leave—even though the lesson may be painful—and apply this valuable knowledge the next time you hire. The next person you hire determines your future.

Wayne Outlaw is author of “Smart Staffing: How to Hire, Reward, and Keep Top People For Your Growing Company.” He may be reached at http://outlawgroup.com.
Perkins Engines has launched its new emissions-compliant 400 Series range of compact diesel engines. The 2, 3 and 4 cylinder engines have been designed to increase the comfort of construction machine operators through big reductions in noise and vibration harshness (NVH). Industry research carried out by Perkins has shown that NVH is a crucial factor in the comfort of users who typically can spend up to 8 hours a day operating machinery. Bruce McMillan, Perkins' industrial engine sales manager said, "With the new 400 Series, Perkins will grow its share of the expanding market for smaller construction machinery. Reliability and durability are assured, as well as the benefits available through our extensive support network. People may not hear the 400 Series, but they will certainly be aware of its presence." For more information contact Mike Reinhart, Perkins North America at 248-374-3123. Fax: 248-374-3110

Afassco, Inc., a Carson City, Nevada based manufacturer of first aid disposable medical and pharmaceutical products, announced the introduction of a uniquely packaged sunscreen. SunFree is packaged in a poly foil unit dose. Aside from being PABA-free and waterproof, SunFree is SPF 25 and has UVA/UVB protection. For more information call Jim Grant at 800-441-6774 or write to Afassco, Inc., PO Box 1767, Carson City, NV 89702

Keslick and Son Modern Arboriculture, with the help of John A. Keslick, Jr., a tree biologist, has developed CambGards, broad belt-like material for staking trees, which will allow the tree to sway and prevent the girdling damage depicted. Made from recycled tractor trailer inner tubes and 100 percent brass grommets, they help protect the tree from the damage that can occur from the wire connections used when staking a tree. For information check their Web site at www.chesco.com/ --treeman/camb/ or call 610-696-5353.

Westfield Products, a British company, introduced Slug X, a chemical-free slug trap designed to revolutionize the removal of slugs and snails, the pests many gardeners regard as their worst enemy. Slug X trapped up to 50 slugs and snails overnight during trials. The lightweight polypropylene box can be regularly repositioned on any flat surface in areas where slugs rest during daylight hours, usually in or close to ground cover such as long uncut grass or clumps of permanent plants. It can also be placed on lawns, patios or in greenhouse staging areas to protect young seedlings. The trap doesn't present a hazard for pets and wildlife. For more information, contact Olivia Brown at 212-745-0446
Vermeer Manufacturing Company announced the introduction of its BC625A brush chipper. It is built for maximum cutting performance to handle brush and debris up to six inches (15.2 cm) in diameter. It features a four-sided bed knife and a thicker cutting disk for more cutting inertia, and an improved variable-speed hydraulic system that delivers 20 percent more torque to the feed roller. Safety is optimized by a long 64-inch (162 cm) feed table which provides more distance from the cutting action. The discharge chute rotates 240 degrees to direct chips away from the operator. An extendible tongue allows the flexibility to hook the 625A to a tow vehicle regardless of the hitch length. The compact, narrow design with a low profile makes it easier to get the machine where it is needed. Three engine options are available, including a 20 hp Honda, a 25 hp Kohler Command and a 23.5 hp water-cooled Perkins diesel. For more information, contact Brian Metcalf at 888-837-6337.

SOLO has entered the spreader market with a portable spreader that can spread a wide range of materials—from ice melters, oil absorbers and sand, to fertilizers, seed and cleaning agents—over irregular terrain more conveniently than a wheeled spreader. The Portable Spreader Model 421S features a build-in agitator and propeller operation that eliminates blockages and improves uniformity of spread. The unit has adjustable directional spreading with fingertip controls and is constructed of reinforced polyethylene materials that prevent rust and clogging. The spreader weighs 5.5 pounds and offers up to 20 pounds capacity. For more information call 757-245-4228 or visit their web site at www.solo.usa.com

STIHL introduced the HT 70, a fixed length pole pruner that can reach branches 10 to 11 feet off the ground. With a unit weight of 11.8 pounds, the HT 70 is a lighter alternative to the HT 75 telescoping pole pruner. It can be used to trim branches, tall hedges and small tree limbs that don't require a telescoping shaft. Other features include the Easy Start system and an automatic gear-driven oiler that can be found on STIHL's O21 and O25 chain saws. For more information or for the name of your closest retailer visit their web site at www.stihlusa.com or call 800-GO STIHL (467-8445).
Wood-Mizer Opens Missouri Service Center

Located in Mt. Vernon, Mo., Wood-Mizer’s new Springfield-area facility is ideal to meet the growing number of customers west of the Mississippi. The Service Center means easier access to parts and service. New mill pick-ups and mill training are available through the center and in the future, Wood-Mizer will be adding their popular blade resharpening program, ReSharp, to the list of services available.

Swingle Earns Historical Appreciation Award

Swingle Tree & Landscape Care received an award on Arbor Day 2000 from the Forestry Staff of the City and County of Denver for its contributions to Denver’s Urban Forest. Tom Tolkacz, president of Swingle said, “We know that historical trees can be landmarks in our community.” Projects included Denver’s historic Shakespeare elm and Richthofen elm. The Shakespeare elm, over 50 feet tall, was grown from original seed of the elm that shadows Shakespeare’s grave at Stratford-on-Avon. The Richthofen elm shades the grave of the wife of Baron von Richthofen, Denver’s first suburb developer. Swingle has also coordinated the injection of 105 American elms with “Dutch trig,” the newest, most promising material to aid in the preservation of American elms.

STIHL Honored

President Fred J. Whyte, members of the executive committee and the STIHL Trimmer Corps were honored by Va. Senator Charles Robb at the 17th Annual Virginia Forum for Excellence. The US Senate Productivity and Quality Award (SPQA) is the longest running award of its kind in the country. STIHL was the SPQA 1999 winner of the Medallion of Excellence award in the private sector manufacturing category which recognizes their quality and productivity results.

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5. Runners: 8" structural channel
6. Cross Members: 3" structural channel
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House Fights to Delay Ergonomics

On June 8, the U.S. House of Representatives turned back an attempt to remove language from the labor department funding bill that would block OSHA from completing its controversial ergonomics rulemaking. The 220-203 vote derailed an amendment offered by Rep. James A. Traficant Jr. (D-Ohio) from the Labor and Health and Human Services fiscal 2001 appropriations bill and was hailed as a significant victory for industry groups fiercely battling the OSHA proposal.

The ergonomics measure, designed to protect workers from musculoskeletal disorders, has been fast-tracked for completion by the end of the Clinton administration. If legislators are to delay the rule, they must attach similar language to the Senate version of the fiscal 2001 spending bill for the departments of Labor, Health and Human Services and Education, or wait until the House and Senate are reconciled in conference. It is likely that Sen. "Kit" Bond (R-Mo.), chairman of the Small Business Committee, will spearhead the effort in the Senate against the OSHA rule.

The Clinton administration has vowed to veto the Labor-HHS funding bill (H.R. 4577), in part because of the ergonomics language in the House version.

Senate Moves to Delay

In a letter to colleagues dated June 13, a group of Senate Republicans indicated that they are planning to push for a one-year delay in the ergonomics rulemaking when S. 2553 goes to the floor. Charging that OSHA is "forging recklessly ahead with a standard that has many serious problems," the senators called for action to ensure the agency "takes sufficient time to consider all aspects and effects of its proposed rule, so that it acts not for political reasons, but in a manner that is well informed, logical and in the best interest of workplace safety."

The letter was signed by Sens. Michael B. Enzi (R-Wyo.), Sam Brownback (R-Kan.), Chuck Hagel (R-Nebr.), Tim Hutchinson (R-Ark.), Jeff Sessions (R-Ala.), and Kit Bond. Enzi is chairman of the Senate Health, Education, Labor and Pensions Subcommittee on Employment, Safety, and Training.

Bond is the sponsor of a stand-alone bill, S. 1070, that would also delay the rulemaking. That version has 48 co-sponsors, but its supporters have thus far been unable to bring it to the Senate floor (29 OSHR 637).

House Vote Applauded

Proponents of the GOP-backed restriction hailed the June 8 vote and said their efforts to block the OSHA rule are gaining momentum. Rep. Anne Northup (R-Ky.), who crafted the House language, noted that opponents of the rule were able to attract three more votes to their side than they did last August when the House voted for a bill sponsored by Rep. Roy Blunt (R-Mo.) to block the ergonomics rule. That stand-alone bill was approved in the House by a vote of 217-209.

Defeating the OSHA rule is a top priority for many of the nation's large industry associations, along with the National Coalition on Ergonomics (NCE), an alliance backed by the U.S. Chamber of Commerce. The National Arborist Association continues to support NCE initiatives through NAA's dues payments to the coalition.

The NAA urges tree care professionals to write their representatives in support of the House amendment and Senate bill delaying implementation of the ergonomics rule. For the addresses of your representatives and a sample letter, see the NAA's Web site at www.natlarb.com.

Peter Gerstenberger is vice president of business management, safety & education for the National Arborist Association.
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By Thomas G. Dolan

A basic tool for commercial tree care companies, chippers have undergone extensive design changes in recent years that make the job of arborist easier, safer and more productive.

As with most technology, these changes are being driven by market forces. For instance, fewer people want firewood, so this material has to be disposed of rather than burned. Environmental concerns and regulations regarding the disposal of green waste force tree care companies to utilize as much of the tree as possible. Economics plays a role, too, as the machines become more efficient and the resulting chips more uniform and of higher quality. And, specialized approaches to tree disposal are leading toward greater customization of chippers.

Drum or disc?

The drum-style chipper, shaped like a barrel, normally sits perpendicular to the inward flow of material through the chute, and rotates downward with two to four knives, which cut at...
an angle. There are two different kinds of drum chipper. In one, the wood waste drops into a cavity, where it is held by centrifugal force until it is flung outside through the opening. Instead of having a cavity, the other style throws the chips to the sides of the drums, where paddles pick them up and fling them out. One disadvantage of the cavity can be that gummy or wet material can clog it. But, depending upon size and application, both kinds have their uses.

A disc chipper, on the other hand, has knives mounted on the sidewalls of the disc. The disc rotates, often at an angle to the material, which it grabs from the feed rollers and cuts up as it passes to the other side and is pulled upwards through the chute.

"We continue to make disc chippers, for there is more demand for this power feed type," confirms Jay Feldman, an equipment specialist with Salgo, Inc. in Cheshire, Conn. He explains that Salco's disc chippers have speed sensors that monitor engine load. The sensors stop and start the engine automatically, without the danger of stalling. The machines also have a hydraulic lift that allows for a safer and easier raise of the feed roller.

The old-fashioned chippers worked quickly and effectively, notes Dennis Beam III, president of Wood/Chuck Chipper, Inc. in Shelby, N.C. "Many older machines continue to be used, or when finally worn out, have been rebuilt. There is a continued demand for them."

In response to this demand, Wood/Chuck is introducing them again, but the company incorporates the newest technology. Hydraulic drum styles are also becoming popular, and David Doskocil, president of Doskocil Industries in San Bernardino, Calif., reports that, though he is now a disc manufacturer, he also intends to pursue the new drum.

"We have seen the need for both disc and drum chippers, so we offer both," says Duane DeBoef, product champion with Vermeer Manufacturing, Inc., in Pella, Iowa. DeBoef points out that different applications can make one type more suitable than another. "With palm type material, a drum does extremely well," he says. "And a lot of times a disc will produce a finer, more uniform chip quality."

Safety factors

The return of the drum chipper is made possible by incorporating safety features not available before. In fact, both drum and disc manufacturers are responding to safety concerns with modifications.

"The height of the feed chute has a lot to do with it," says DeBoef. "We make the infeed table higher than a person's knees, so it's harder for the operator to fall over. Even if the person feeding brush does fall, his hands would not become engaged."

Gravely machines have an emergency stop device that the operator can reach easily with a free hand—or even a hip—to bring the machine to an immediate halt. The machines also can't operate if any bed or cutter knives are exposed. Finally, a switch on both the infeed and discharge chutes prevents the machine from starting if the chute cover is open.

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**Maintenance improvements**

Maintenance is related to safety in that if the operator can get to the machine to clean or repair it easily, there is much less danger of injury due to slips or falls. Here are a couple of examples of the maintenance efforts that some manufacturers are making.

"We've looked at chippers and noted how big they've become and how troublesome they are to maintain," says Doskocil. One solution he's come up with is a slide-gate system, whereby the feed roll chamber and hopper assembly are not completely welded to the chipper. Instead, with the bolts removed it can be slid back 18-inches. "This allows someone to service it without having to crawl under or into the chipper," he says.

Leslie Kinnee, a spokesperson for Bandit Industries, Inc. in Remus, Mich., explains that improvements to Bandit’s digital auto feed speed governor include speed switch, hour meter and tachometer all in one package, which take up less room with less wiring. A major improvement over old chippers, this one receives three different types of input signals (alternator, magnetic pickup and battery ignition). If a problem should occur, operators may simply unhook the wires and send the product back to Bandit. Kinnee adds that Bandit also features a hand-held device that quickly touches up chipper knives while they are still in the machine. "One swipe usually brings a dull blade back to life," she says.

**Size differences**

Bigger can be better, but sometimes small is still beautiful.

What’s getting bigger, says Bob Engler, president of Woodsman, Inc. in Clare, Mich., is the diameter of the chipper. This is one of the most hotly competitive trends. "The wider the opening, the more brush you can get in without the danger of it getting hung up," he notes.

Typically, the size of the opening (6, 9, 12, or 14 inches), dictates the type of application. But newer models extend to 18 inches on some machines.

What has really changed, explains Engler, is that the chipper throat is getting wider. "It used to be 14 inches wide, but now it’s 24 inches." In addition, Engler adds that knife length has gradually increased from 12 to 13 inches to the current range of 20 to 24 inches.

While users want more capacity and power, they also want "lighter machines..."
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that can still handle a big job. Manufacturers have to accommodate that," says DeBoef.

One way Doskocil does this is by using a ratchet as opposed to the conventional weight system, which can add 300 to 400 pounds to a machine. A ratchet applies pressure without the weights, and also does away with the springs, which can wear out.

Beam notes that, "Not only are self-feeding drum chippers getting bigger, but, at the other end of the spectrum, they are getting smaller and simpler, designed to handle 6-inch or less brush material."

One reason for both lighter and smaller machines, says Kinee, is the need to move them around in close suburban settings. The technology and innovation in chippers goes beyond bigger, more productive machines, explains Kinee. "The trend is toward differently sized chippers for different needs. The market is looking for small chippers that can be pulled by a truck small enough that the driver needn't have a commercial driver's license." Also in demand, says Kinee, are "chippers that are able to fit into small, tight areas."

Another trend that seems to be picking up speed among larger volume commercial operations is feeding the chipper mechanically. Whether this is a reflection of labor shortages or new models of small loaders, companies are definitely tending toward machines that can be fed mechanically by a front-end loader.

**Rev up the horsepower**

"With the trend toward higher capacity models, there's a need for higher horsepower," says Mark Rau, assistant sales manager with Morbark, Inc. in Winn, Mich. "I attribute this to increased regulations regarding burying or burning of trees. Arborists need more horsepower to use up the tree."

Changes in environmental regulations have forced another change in chipper manufacture. Though Rau concedes that gas engines still have their place, diesels are becoming dominant, due to longevity, performance and the need to meet air quality standards.

On the other hand, Engler says he is actually lowering the horsepower on his machines, on which he has made auto-feed a standard feature. "Five years ago, the machines went at 121 feet per minute, now they do 85-95 feet per minute," he says. It's the slower rate which requires less horsepower, he explains. "The faster rate tends to pull the brush out of your hands. This way the brush will be pulled, but not you, so it's safer."

Also, if the rate is steadier and slower, Engler insists, it's actually more productive for arborists who don't have to worry about the machine jamming. When that happens, somebody has to stop it to reposition the material. "The result is increased safety and performance," Engler says. "You don't have to worry about human error, and people can get away from running the machine since it can run itself."

Kinnee concurs that convenience features can minimize the need for mechanical power—at least in some specific areas. These include custom-built winches to fit user specifications, a height-adjustable discharge, which allows an operator to fill different trucks, and a hand-crank swivel discharge, which turns easily to fill trucks faster.

**Aesthetics**

One usually thinks of a chipper's functionality rather than its looks. But looks are also becoming important, says DeBoef. He reports his company is making a smoother, rounded, less jagged looking machine, since users are realizing that image is important as the chipper
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The Salsco Model 813 Wood Chipper has two reversible and adjustable 1-inch thick bed knives—one horizontal and one vertical—to insure that everything introduced into the chipper is completely chipped.

The Vermeer BC625A Brush Chipper has a four-sided bed knife and a variable-speed hydraulic system.

Wide chipper throats and longer knives keep brush moving steadily on this Model 2018 drum-style chipper from Woodsman.

is pulled behind a truck or moved into a yard. There is also a call for more custom painting these days to make the chipper’s colors match the arborist’s company colors. Quieter chippers are a related consideration that is becoming more important, especially when chippers are used in residential areas.

Quality

“When you consider a purchase, always investigate the quality of the construction,” says Rau. “When you consider what a chipper does—crush a piece of wood—it takes a lot of force and stress, especially when it happens over and over again. So quality heavy-duty construction is essential.

“And, if I were shopping for a chipper, I would figure out the size of wood I would be chipping and realistically run it at one-third of its capacity,” Rau recommends. “For instance, I would buy a 12-inch chipper to chip 9-inch material. You don’t want to run a station wagon like a race car.”

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In the United States, it is not a question of whether a severe storm will affect a community, but when it will happen. Large-scale or regional storms that cause excessive tree damage can cripple communities, compromise public safety and typically result in a state of emergency declared at the state or federal level. State emergency management agencies often require communities to submit an initial damage estimate within 12 hours of the end of the storm, even if they have not yet declared a state of emergency. This estimate of storm damage should be realistic and credible, and is necessary in order to initiate the reimbursement process. The question for most community foresters is how to collect reliable information and prepare an initial report in the 12-hour window required by some state emergency management agencies.

The initial estimate of costs related to storm-damaged trees can vary widely between communities, even if the amount or type of damage to the communities is similar. A survey of 14 western Massachusetts communities following a severe winter storm in April of 1997 reported initial estimates of tree damages ranging from $1,000 to $100,000 per community for like amounts of damage.

During a storm emergency, municipal officials often complete the initial damage assessment while involved in crisis management. Communication with emergency-response personnel or quick visual surveys of impacted areas are common damage-assessment procedures, but in most cases these are poor indicators of what the storm's total cost will be. Municipalities, trying to manage a crisis, often overlook costly tree problems. Having a storm damage assessment procedure in place before the storm strikes—and a qualified damage assessor assigned to complete the assessment—provides a level of preparedness that will allow municipal officials to concentrate on the emergency-response activities. Once the assessment is completed, it can be forwarded to the proper agencies with little interruption to the municipal storm cleanup process.

Communities have differing needs and resources. Depending on the size of each community, budget and staff, communities will vary in their ability to plan for and respond to natural disasters. This prototype is designed to be adaptable to communities regardless of size, physical layout or level of technology used by a municipality. The result will be a simple, credible and immediate assessment of a community's storm-damaged, street-side trees. The following benefits may also be realized by implementing this procedure:

- A damage assessment plan may help set priorities for emergency-response decisions by identifying areas within the community susceptible to tree damage.
- An accurate assessment of damage early in the crisis will increase the potential for state/federal reimbursement.
- Using a standardized method for assessing tree damage may speed up the reimbursement process.
- The entire planning process encourages communication and involvement among municipal departments in planning for storm emergencies.
- The initial assessment encourages early communication with Emergency Management Agencies and simplifies the reimbursement process.
- Communities statewide or regionally can be compared and tallied.

Basic requirements

In order to guarantee effectiveness for this process, the municipality needs to prepare a plan and have it accepted before a storm ravages the area. This storm damage assessment procedure is designed to be adaptable to all types of communities, regardless of size or available technology. Two basic requirements are necessary to set up the planning stage of this process. The first is an accurate base map of the community. This could be as simple as a real estate map or as advanced as Geographical Information System (GIS) data. Other options include topographical maps, aerial or orthophotographs, or a completed street tree inventory in map form. The second requirement is a thorough knowledge of the municipality's road system and community forest. The community forester needs to collect this information and should get the community's municipal departments and emergency managers involved in this planning process.

Getting started

Using the base map, determine the total miles of road in
the community. This information is readily available from the public works department. Next, locate and mark on the map those roads that have trees growing alongside or near them. This should include all publicly and privately owned trees that could impact public roads during a storm. Those roads that are not under the municipality’s jurisdiction, or do not have potentially damaging trees along them, should not be marked on the map since they normally are not a factor in cleanup efforts by the municipality and are not eligible for state and federal aid. Identifying the roads susceptible to storm damage can be accomplished using aerial photographs, a street tree inventory map or a windshield survey of the road system. Once identified and marked, estimate the miles of tree-lined roads. This number will be a percentage of the total road miles and will be used when determining sample size.

The key to this system is to establish permanent sample plots that may be surveyed prior to a storm. The sample plots should be randomly chosen from the susceptible areas marked on the base map. The recommended plot size is a 1/10-mile along the road. This distance is easily walked and accurately measured with a vehicle’s odometer. The width of the plot should encompass both sides of the street and be measured as far from the road as necessary to include all trees that may impact the road during a storm. The data collected in each plot will consist of the number of trees, species, height, DBH and proximity to the road. In most cases, a 100 percent inventory can be accomplished.

The sample size will be a percentage of the total of tree-lined streets in the community—divided into numerous sample plots. Ideally, the sample size should be large enough to represent the community’s urban forest, but more importantly, it must be small enough so all the plots can be surveyed in several hours. This sample survey will provide an initial assessment of the storm-damaged trees, rather than the complete tree inventory of a community. Since the plot inventoried 100 percent of the trees that could affect the street, following the storm the assessor can inspect each plot and establish the amount of damage. The intent is to use an established, plausible method to initiate the damage assessment and reimbursement process—something more reliable than a quick windshield damage survey taken immediately following a storm. The results of this assessment are the foundation for a more thorough survey taken in the days after a storm.

**Plot inventory**

The inventory of street-side trees in the sample plots for the storm damage assessment method is similar to a standard street tree inventory, since the trees’ locations, species and size are recorded. It differs from an inventory because it only lists the trees that can affect the street during a storm, and in certain situations, the plot data can be generalized. The objective is to assess how the trees in the sample plot could impact the immediate area during a storm, rather than to determine the exact species, height and DBH of the trees for management purposes. For example, if a plot area is 1/10 mile long and heavily wooded on both sides, tree height and DBH can be estimated, and the trees classified by the type of stand.
Table 1
Priority Rating System

Road System: Set priorities according to use and importance to public safety
Example:
High Priority - main thoroughfares and emergency routes
Medium Priority - secondary roads; residential streets
Low priority - unpaved roads; dead ends; private streets

Land Use: Set priorities according to commercial and residential features such as housing, population and land use.
Example:
High Priority - populated, high-density urban residential areas
Medium Priority - residential neighborhoods; populated rural areas
Low priority - institutional land; private property; low population areas

Street-Side Trees: Set priorities according to the likelihood of trees affecting the street during a storm. Consider the trees’ density, height, and proximity to the road.
Example:
High priority - many large trees near the road in a populated area
Medium priority - secondary roads with trees near the street
Low priority - no trees that can affect the road system, private or institutional lands or unpopulated areas (no sample plots will be in low priority areas)

<table>
<thead>
<tr>
<th>Description</th>
<th>Points</th>
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<tr>
<td>Land Use</td>
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<tr>
<td>Area type:</td>
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<tr>
<td>Industrial/retail</td>
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<td>Rural/business district</td>
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<tr>
<td>Suburban residential</td>
<td>2</td>
</tr>
<tr>
<td>Urban residential/emergency facilities</td>
<td>3</td>
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</table>

| Roads:       |        |
| Unpaved dead end | 0    |
| Rural paved/unpaved | 1    |
| Secondary/neighborhoods | 2    |
| Main thoroughfares/emergency access routes | 3    |

| Street-Side Trees |        |
| Density (spaced along road): |        |
| No trees | 0    |
| Low (>31 m (100 ft) apart) | 1    |
| Med. (15 m (50 ft) to 31 m (100 ft)) | 2    |
| High (< (15 m (50 ft)) | 3    |

| Height:       |        |
| Less than 5 m (15 ft) | 0    |
| 5 m (15 ft) to 8 m (25 ft) | 1    |
| 7 m (25 ft) to 12 m (40 ft) | 2    |
| Over 12 m (40 ft) | 3    |

| Proximity to street: |        |
| Over 15 m (50 ft) away | 0    |
| 12 m (40 ft) to 15 m (50 ft) | 1    |
| 6 m (20 ft) to 12 m (40 ft) | 2    |
| Less than 6 m (20 ft) | 3    |

| Priority Ratings |        |
| High Priority (13-15 points): | These areas are essential for public safety and susceptible to storm damage. |
| Medium Priority (6 to 12 points): | Not critical to public safety but susceptible to storm damage. Most areas within the community will be in this category. |
| Low Priority (0 to 5 points): | These areas should not be sampled or considered in the damage assessment. |

Example: 110 mixed hardwoods, 15 to 20 inch DBH, 30 to 40 feet high and 10 to 20 feet from the road.

Following are the steps required for inventorying each sample plot:

Step 1
Locate and mark the plots’ locations in the field.
It is advisable to begin each plot at a road intersection, and use a permanent marker at the opposite end of the plot. Being able to find the plot markers after a storm is more important than placing a marker at exactly 1/10 mile. If a permanent landscape feature such as a mailbox, tree or utility pole is close to the 1/10-mile measurement, it can be used as a marker. Other permanent markers could include paint, stakes or a Global Positioning System (GPS) coordinate. Consider low visibility and adverse conditions during the damage assessment when choosing a plot marker. (Photo # 5)

Step 2
Record data.
Inventorying the trees in each plot prior to the storm will provide information for the damage assessment so the assessor can compare pre-storm and post-storm conditions. It might be advisable to take photographs of each sample plot before and after a storm. This information can be used to better delineate the community’s urban forest and how it was affected by the storm. An added benefit of this stage of the process is that it allows communities to identify areas that may be more susceptible to tree damage on roadways that are critical to public safety. This is accomplished by prioritizing an area according to the likelihood of potential tree damage—and its impact on public safety. A rating system (Table 1) can assist this process and can be implemented when identifying the community’s tree-lined streets at the beginning of this process. Following is the recommended data that should be recorded for each sample plot:

- The plot location and sample direction
- The tree type or type of stand
The number of trees in the plot
- Tree density, measured by the spacing between the trees
- Estimated height and DBH range of the individual trees or stand of trees
- The proximity of the trees to the street

Implementation

Assessor qualifications

Damage assessor(s) could be part of a municipality's forestry staff or may be contracted from the private sector to perform the task. If a municipality decides to establish sample plots using in-house staff and contract out the actual damage assessment, the person doing the assessment must be briefed ahead of time on the location and content of the sample plots. Dependable communications with the local storm center or crisis coordinators and a reliable vehicle (four-wheel drive in winter storm conditions) are advisable, due to the potential dangers involved.

Whoever does the assessment should not be obligated to participate in emergency response and clean-up efforts. They should also reside locally (or be available on short notice), be familiar with the area and possess the following qualifications:
- Experienced in estimating tree work. For example, retired tree wardens, commercial or consulting arborists or retired utility arborists
- Able to determine equipment needs for hazard mitigation and cleanup efforts
- Be familiar with storm-damaged trees and related hazardous conditions
- Knowledgeable of the damage assessment process and plot locations

Response

Once the storm has passed, the damage assessor needs to survey the plots as soon as possible. The assessor should follow a pre-planned, efficient route between plots, but should be aware of other routes in the event that the planned route is blocked.

For each plot surveyed, the assessor will record hours on a damage-assessment form, the amount and type of damage, the equipment needed for removing hazards and debris, and the time required of equipment and crew. Once all plots have been surveyed, the data can then be used to estimate the total resources needed for addressing the rest of the community's tree damage. (Fig. 1)
Case Study: Amherst, Massachusetts

This case study was conducted in Amherst, Mass., during August 1998. Meetings with the Department of Public Works supervisor, tree warden and a town engineer revealed that Amherst has approximately 100 miles of road of which 75 miles have trees located near enough to affect them during a severe storm. A windshield survey and a study of aerial photographs of Amherst's road system and street-side trees confirmed this.

In order to pilot test this assessment procedure, the total distance of tree-lined streets was based on the percent of streets in Amherst that have trees growing next to or near them; in this case approximately 75 of 100 miles of road. This study used a 2 percent sample of the total tree-lined streets and consisted of 15, 1/10 mile-long plots. Public roads susceptible to tree damage were marked on the base map and 15 sample plots were randomly chosen along these streets throughout the community.

Once the plots were established, it took about four hours to revisit each plot in optimal weather conditions, or about 15 minutes per plot. A larger sample size for this community could pose a time constraint on post-damage assessment procedures, and was not recommended.

The sample data noted below are examples intended for illustrative purposes, since no severe storms have occurred since the start of this study. The following is an outline of the process used to set up and implement the initial damage assessment for Amherst:

**Five steps to estimating total damage based on sample plot data.**
1. Determine the total miles of tree-lined streets
2. Calculate the number of total sample miles
3. Record the total damage for all plots
4. Set up a formula to estimate for entire community
5. Estimate the required resources needed to clean up after storm

**Data from Amherst, Mass. (Aug. 1998)**

**Step 1**
100 miles of roads x 75% tree-lined = 75 miles total tree-lined roads

**Step 2**
Two percent sample size x 75 miles tree lined roads = 1.5 sample miles. (Fifteen plots of 1/10 mile each were chosen in high and medium priority areas.)

**Step 3**
Total plot damage (fictitious): Crew / equipment hours for 15 plots or 1.5 miles of road were estimated at 12 crew hours

**Step 4**
Set up the formula
12 hrs. = 8 hrs / mile x 75 miles = 600 crew hours for entire 1.5 miles community clean-up

**Step 5**
Determine the resources needed (ten crews are available)
10 crews, 11 hours a day = 110 crew hrs./day
600 crew hrs. = 5.45 days of clean up time
110 crew hrs./day or
600 crew hrs @ $ ____/crew/equip. hrs. = $ ____ Initial damage est.

**Figure 1.** Each plot should have a separate Damage Assessment Data Form that corresponds to the Sample Plot Data Form. The Damage Summary section will provide information on the type and amount of damage that may be useful for future management strategies.
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Discussion

What became very apparent during the northern New England and New York ice storm of 1998 was that a uniform method for measuring community tree damage immediately following a severe storm was needed. In the 1998 storm, each state used its own system to estimate the amount of tree damage present, which made it difficult for federal disaster teams to accurately estimate the total damage. This project proposes a methodology that can give arborists and emergency management officials a system that effectively provides municipal, state and federal officials with a uniform estimate of damage and projected costs within the 12-hour window required for completing the initial damage assessment by the Federal Emergency Management Agency (FEMA).

This damage assessment method represents a preliminary model and is intended to provide an initial overview of tree-related storm damage during the normally confusing hours immediately after a severe storm. The sampling method and accuracy still need to be tested in actual storm conditions, and adjustments to the methodology for choosing sample size and plot locations may be necessary. Currently, the USDA Forest Service's Northeast Center for Urban and Community Forestry, in cooperation with the states of New York, New Hampshire, Vermont and Maine, is working on the development of a standardized damage assessment protocol. The Davey Resource Group has been awarded a grant to begin preliminary work on this protocol.

This storm damage assessment system could be a useful tool in an emergency, but its strength lies in the planning stage of emergency response. Once established, municipal and emergency response officials can focus on emergency management and public safety during and after a storm. The often neglected task of providing the initial damage assessment to state and federal emergency management agencies will become less of a distraction and more of an asset to a community’s emergency preparedness and response operations.

David C. Hawkins is former tree warden of Boston and an urban forestry consultant in Pelham, Mass.; David V. Blomiarz is USDA Forest Service urban forester and coordinator of the Northeast Center for Urban and Community Forestry at the University of Massachusetts, Amherst; and H. Dennis P. Ryan III is associate professor of arboriculture/urban forestry, department of natural resources conservation, University of Massachusetts, Amherst.

Acknowledgments

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Retaining
Motivating
By Wayne Outlaw
Employees are critical to our success. We have to do a better job of keeping them. There may be some employees you don’t want, but if you don’t hang onto the good ones, it will be much more difficult to let even the bad ones go. Well-trained employees are an incredible investment for a tree care company. As an owner, you want them to take care of your customers because, as we all know, the happier your customers are the fatter your wallet will be.

Employees don’t treat your customers any better than you treat your employees. I have had people tell me that they cannot get their employees to take care of their customers the way they should. I always ask how they are treating their employees. Are you treating your employees in a way that will make them want to stay with you? What are some of the reasons people stay with you?

Benefits

We used to think a good wage was really the only thing a person was looking for. However, offering a variety of benefits and meeting the needs of employees absolutely decreases turnover. We did a survey of employees, and here are the results.

1. Medical insurance, especially for those with pre-existing conditions, was the number one issue. It is very important.

2. Time off is number two because of the age of the employees you have, which is fairly young. They think differently, and value different things than the older generation. I came along in an environment that you would do whatever it took to get the job done—six or 16 hours. These days, people think differently.

3. Retirement scored high as well. If you can devise a program that combines retirement pay with profit sharing, you will have a motivational and employee retention tool.

Those were the top three. What surprised me about the survey was that promotions ranked eleventh. Is that an accurate answer for your company? Find out. Survey your employees.

Company owners have a limited amount of money to spend on employee benefits. Don’t spend on things your employees don’t value. Maybe all your crews would prefer time off to retirement benefits. If so, you are spending money on things that aren’t increasing employee retention. Match the benefits to the individual. That way, you match them to your employees’ needs.

What benefit do you offer that really makes your employees enthusiastic? A birthday off with pay? Do you let your crew leader take your boat out once a year? Think about what makes employees feel good and keeps them connected to your company.

What about bonuses? If employees get into the habit of doing things only for the bonus, you aren’t getting your money’s...
**Retention strategies**

**Orientation:** Keeping somebody is a process that starts the first day. Make it special. You have a place for new employees, and you must work to integrate them into the organization. Use the information that you learned during the hiring process to acclimate them to the organization.

Make new people feel glad they are working for you. Introduce them to your staff. You do not get a second chance to make a first impression.

Once new people are introduced and settled, begin with your orientation. Orientation is not teaching people things. It is a process that helps employees develop a sense of belonging. Tell them who you are and what you do. Tell them your values and how you treat your customers. Set their expectations as to what they will be doing as they move through the company. If you do not do a good job of setting expectations in the beginning, you will be forced to repair and rebuild. If we take care with employees that very first day, we should not have to go back and do damage control later.

**Skills training:** Once you have introduced employees to your company, you need to train them. Create a list of skills and practices a person needs to master. Define a standard of performance. Identify the trainer and determine how long that training will take. Set a deadline with a schedule. Part of that schedule should include having new employees certify that they can do the job.

Make a list of tasks and skills, including the people who will supervise the training. At the bottom of the page, have this sentence: “I have been satisfactorily trained on all the items listed above and can meet company performance expectations.”

We have found that employees will read this and say they have not been shown everything. In this way, you can learn what employees know and don’t know. If you create these sheets for each specific skill needed, you will know if employees are getting the information they need, bypassing problems down the road.

**Expectation levels:** You also have to build employee self esteem. You can’t affect what happens to them outside the job, but if they feel better about themselves at work than anywhere else, they will start to come to work with a positive attitude. If they do not feel good about themselves at work, they will find work someplace else.

You can accomplish this by showing genuine concern for your employees. You don’t have to give employees money to show genuine concern; there are other options. You can show them by listening and tun-
ing in to the person. Since nobody wants to sit and listen to problems, you may be the only one who does listen. Employees value that.

Set high expectations, give them performance feedback and reward performance. If you give employees the message that you believe they can perform at a high level, they tend to perform in that way. If you rush and take responsibility away at the first sign of trouble, you are making it clear you do not trust them. Let them make a few mistakes. They will learn and believe that you trust in their ability.

The way you treat people can change their behavior. If your crew leaders treat employees as if they are no good, they will probably live down to that expectation. Good, capable, competent, talented managers have a unique way of setting high expectations where, all of a sudden, employees meet those expectations.

Here’s a quick checklist.

♦ Are you setting high expectations?
♦ Do you show genuine concern for employees?
♦ Do you treat all groups equitably, or are you favoring one group over another?
♦ Do you make sure that all your new hires are treated well?
♦ Do you bring them in and provide them challenging assignments?
♦ Do you avoid jumping in and taking over at the first sign of trouble?
♦ Do you stick with employees even if they are having trouble?
♦ Do you give consistent and candid performance feedback?

Career development: Ask people what they want to do. If an employee wants to work for you for five years then move on, fine. Help that person be your best employee for those five years. If you don’t support him, he is going to go anyway. You might as well let him be productive while he works for you. Give your employees the opportunity to develop. A lot of employers think that if they keep their employees from going to school and learning more, they will stay. They complain, “As soon as I pay for an employee to become certified, he leaves.” Well, they won’t stay if you don’t. Give them the development and learning that they need.

Coaching: You think about field coaching all the time. Most tree work is on-site with customers. How often do you show employees what to do, then leave them alone? That’s not enough. Show employees how to do the work, do it with them, then allow them to practice. Later, come back, observe and critique their work. Feedback, both positive and negative, is a vital part of coaching. If the only time employees hear about their work is when something negative occurs, how will they react? They will try to avoid hearing how they are doing.

If you want to keep good people, you need to take the time to tell them what they are doing correctly, as well as what they are doing incorrectly. Keep it simple. Tell them what they have been doing really well, add what they need to work on, and
then end with something good. If you don’t have anything good, then you should have done something earlier.

Part of this process should be asking employees how they think they are doing. I do that for a reason. If employees think they are doing a superb job, and they aren’t, you have a real big problem. If employees know they aren’t doing a very good job and recognize they need more help to get better, that is an entirely different problem.

A tree care company can’t prosper without high performers. These people want to know how they are doing. In my experience, high performers think that they are doing worse than they really are. If you ask somebody to rate their performance—and they are really motivated—they will give themselves a lower rating than their manager. If they are not motivated, they will give themselves a higher rating. It benefits you to give them an accurate rating based on a standard rate of production that you have established. This standard should increase over time, so you can measure progress as people become more experienced. In this way, you can track whether new hires are catching on as fast as they should and whether experienced people are maintaining their productivity levels.

Communication: I hear from owners of small companies that they talk to their people all the time. Just because you only have a few employees does not mean that people are communicating. A marriage only has two people, and some couples never communicate. Take the time to communicate. Make bad news acceptable from employees. If you don’t react well to bad news, before long you won’t get any news. Your customers will be unhappy and you won’t have a clue.

Small organizations also have to eliminate what employees see as the “inner circle,” which might be the founder or family members. As the company grows and you add employees, you have to include them. Make them feel as if they are part of the group.

In a formal way take the time for periodic executive interviews. Spend a few minutes understanding employees concerns and thank them for their contributions. For example, “You have worked here for the last two years, and you are doing a great job. We are really pleased with that.”

Instead of waiting for employees to walk in with a resignation, ask how they feel about the company. This is tough for an owner. Your first instinct is to defend the company. Listen.

Your objective is to find out if you are missing anything about your company’s operations. Examine employee—manager relationships. You may not fix all the problems you discover, but if employees feel they have been heard, that may be enough for some problems. The worst thing that you can do is ask what is wrong, and then do nothing. You have to respond, which doesn’t mean you have to do what employees want, but you have to respond in some way. In most cases, it means looking into matters.

Recognition: Money is important in retention, but people will do unbelievable things for recognition—the best psychic income one can get. People want to meet challenges because they feel better about themselves afterwards. Reward effort, not just results, until results come. Be judicious in what you praise, but remember, praise does not cost anything. When was the last time you wrote a note to an employee telling him what a good job he is doing? Celebrate success. Let people enjoy things when they have done well. We all know this, but your challenge as owners is to keep your efforts consistent. You know you should, but when was the last time you did?

Continuous learning: Let employees grow. There are all sorts of educational and training resources available in tree care. As the owner, you should be paying for it. And when employees earn a new skill and make themselves more valuable, are you recognizing that? In most tree care jobs, you can probably set two or three levels that employees can achieve.

Financial incentives: If you have created the most wonderful environment in tree care and a good employee is still considering leaving, think of some financial incentive. I like incentive compensation, also known as pay for performance. If you pay for performance, people tend to perform at a much higher level. If you can get everyone to perform at a higher level, there is money left over to pay them for their efforts.

Deferred compensation is one of the best ways to hang on to employees long term. You could set it up where the company adds a certain percentage of a person’s salary into an investment plan. This should not be part of their salary, but a bonus of sorts—5 percent or 10 percent. If they are still with the company in five years, they can have the money. If not, they forfeit
whatever is in the account.

Employees do not give the company enough credit for the money spent on them. Send out a Total Compensation Summary that shows a person’s salary, commission, bonus, matching IRA payments, and life, health, disability and dental insurance. All told, these might add another $4,000 to a person’s salary level. Show employees that $35,000 in wages is really $40,000 in total compensation.

Conclusion

Even with all of the strategies listed above, employees will leave your company. Make sure you conduct exit interviews. People can be candid when they are leaving, which gives you an opportunity to learn about your business. What did the person think about the nature of the job, the way he used his skills and how his performance was appraised? You need to know why people leave, so you can at least try to correct any problems you discover.

Unfortunately, employees may not be comfortable opening up. You or the manager conducting the interview may be part of their reason for leaving. People want references. You may need to find an impartial person to conduct exit interviews. Give that person a list of questions and write down the answers. I have found that if you really ask the employees what they think, they will tell you.

All of these rewards have a purpose beyond retention. You expect a return for your time and money. You expect an employee to perform at a higher level. Rewards are not grants, and they don’t last forever. The best reward systems are tied to productivity. If productivity comes down, the bonus disappears. If salespeople don’t bring in the business, bonuses and compensation shrink.

Employee retention is an investment of your time and financial resources. Invest in the best resource that you have. Trucks wear out. Invest in people.

This article was excerpted and adapted from a presentation at TCI EXPO ’99. Wayne Outlaw is author of “Smart Staffing: How to Hire, Reward, and Keep Top People For Your Growing Company.” He may be reached at http://outlawgroup.com.
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<td>Contact: Not Available at Press Time</td>
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<tr>
<td>November 9-11, 2000</td>
<td>National Arborist Association</td>
<td>TCI EXPO 2000</td>
<td>Contact: 800-733-2622; <a href="http://www.natlarb.com">www.natlarb.com</a></td>
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</table>
For Tree Care Operations -
Tree, Shrub, and Other Woody Plant Maintenance
Standard Practices

(Lightning Protection Installation for Trees)

Draft 03

Publication of this draft standard for trial use and comment has been approved by the ANSI-Accredited Standards Committee (ASC) A300 secretariat, the National Arborist Association, Inc. Comments from ASC A300 constituents shall be directed to their ASC A300 representative. The representative is responsible for presenting comments to the ASC A300 committee at the next meeting. All other public comments shall be directed to the ASC A300 secretariat. E-mail or fax comments are preferred. National Arborist Association, Inc., ATTN: A300 Secretary, 3 Perimeter Rd. - Unit 1, Manchester, NH 03103. E-mail: Rouse@natlarb.com; Web: www.natlarb.com

Forward (This foreword is not part of American Standard A300 Part 4 - Lightning Protection Installation for Trees)

An industry-consensus standard must have the input of the industry that it is intended to affect. The Accredited Standards Committee A300 was approved June 28, 1991. The committee includes representatives from the residential and commercial tree care industry, the utility, municipal, and federal sectors, the landscape and nursery industries, and other interested organizations. Representatives from varied geographic areas with broad knowledge and technical expertise contributed.

The A300 standard can be best placed in proper context if one reads its Scope, Purpose, and Application. This document presents performance standards for the care and maintenance of trees, shrubs, and other woody plants. It is intended as a guide in the drafting of maintenance specifications for federal, state, municipal, and private authorities including property owners, property managers, and utilities.

The A300 standard stipulates that specifications for tree work should be written and administered by a professional possessing the technical competence to provide for, or supervise, the management of woody landscape plants. Users of this standard must first interpret its wording, then apply their knowledge of growth habits of certain plant species in a given environment. In this manner, the user ultimately develops their own specifications for plant maintenance.

ANSI A300 Part 4 - Lightning Protection Installation for Trees, should be used in conjunction with the rest of the A300 standard when writing specifications for tree care operations.

This standard was processed and approved for submittal to the Accredited Standards Committee on Tree, Shrub, and Other Woody Plant Maintenance Operations - Standard Practices, A300. Committee approval of the standard does not necessarily imply that all committee members voted for its approval. At the time it approved this standard, the A300 committee had the following members:

Tim Johnson, Chair (Artistic Arborist, Inc.)
Bob Rouse, Secretary (National Arborist Association, Inc.)

Organizations Represented: Name of Representative
American Forests: Staff (Observer)
American Nursery and Landscape Association: Craig J. Regelbrugge
American Society of Consulting Arborists: Andrew Graham
American Society of Landscape Architects: Ron Leighton
Asplundh Tree Expert Company: Geoff Kempter
Associated Landscape Contractors of America: Preston Leyshon
The Davey Tree Expert Company: Joseph Tonnis
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Jeff Bourne (Alt.)
The F.A. Bartlett Tree Expert Company: Greg Daniels
International Society of Arboriculture: John Britton
James Skiera (Alt.)
National Arborist Association: Ronald Rubin
Ronald Rubin (Alt.)
National Park Service: Robert DeFeo
Barbara Keene (Alt.)
Professional Grounds Management Society: Kevin O'Donnell
Joe Engberg (Alt.)
Society of Municipal Arborists: Andrew Hillman
Ed Macie (Alt.)
U.S. Forest Service: Mike Galvin (Alt.)
Philip D. Rodbell (Alt.)
Utility Arborist Association: Jeffery Smith
50 Scope, purpose, and application

50.1 Scope
This document presents performance standards for the care and maintenance of trees, shrubs, and other woody plants.

50.2 Purpose
This document is intended as a guide for federal, state, municipal, and private authorities including property owners, property managers, and utilities in the drafting of their maintenance specifications.

50.3 Application
This standard is intended to apply to any person or entity engaged in the business, trade, or performance of repairing, maintaining, or preserving trees, shrubs, or other woody plants.

50.4 Implementation
Specifications for tree maintenance should be written and administered by an arborist.

51 Normative references
The following standards contain provisions which, through reference in this text, constitute provisions of this American National Standard. All standards are subject to revision, and parties to agreements based on this American National Standard shall apply the most recent edition of the standards indicated below.

ANSI/UL 96 Lightning Protection Components
ANSI/UL 96A Installation Requirements for Lightning Protection Systems
ANSI/UL 467 Grounding and Bonding Equipment
ANSI Z60.1 Nursery stock
ANSI Z133.1 Tree care operations - Pruning, trimming, repairing, maintaining, and removing trees, and cutting brush - Safety requirements
NFPA 780 Standard for the Installation of Lightning Protection Systems
29 CFR 1910, General industry
29 CFR 1910.268, Telecommunications
29 CFR 1910.269, Electric power generation, transmission, and distribution
29 CFR 1910.331 - 335, Electrical safety-related work practices

52 Safety
52.1 Tree maintenance shall only be performed by qualified tree workers.
52.2 This standard shall not take precedence over arboricultural safe work practices.
52.3 Operations shall comply with applicable Occupational Safety and Health Administration (OSHA) standards, ANSI Z133.1, as well as state and local regulations.

53 Definitions
53.1 air terminals: A component of a lightning protection system that is intended to intercept lightning strikes.

53.2 arborist: A professional who possesses the technical competence through experiences and related training to provide for or supervise the management of tree and other woody plants in the residential, commercial, and public landscape.

53.3 bonding: An electrical connection between an electrically conductive object and a component of a lightning protection system that is intended to significantly reduce potential difference created by lightning currents.

53.4 branch conductor: A run of main- or secondary-sized conductor that connects an air terminal and down conductor in a dead end configuration.

53.5 cable splicer: A cast or stamped crimp-type bronze/copper fitting used to connect conductors in either an end-to-end, side-by-side, or Y fashion.

53.6 clamp-type fitting (multi-use): A cast connector fitting that uses one or more bolts to secure the connection.

53.7 Class I components: Lightning protection components that meet or exceed the specifications of ANSI/UL 96 and 96A. See Table 1.

53.8 conductor: The portion of a lightning protection system intended to carry the lightning discharge between air terminals and ground.

53.9 connector fittings: A device used to make a secure connection between a conductor and an air terminal; ground terminal; metal body of conductance/inductance; or to another conductor.

53.10 down conductor: The downlead portion of a main conductor.
53.11 electrolytic couple: Contact between metals that are not galvanically compatible, causing an accelerated degradation (corrosion or oxidation) in the presence of moisture. Examples of these combinations are copper and zinc galvanization.

53.12 fastener: An attachment to secure a conductor to a tree.

53.13 grounded: Connected to earth, or to a conductive material that is connected to earth, so that electric charges are distributed freely to the earth.

53.14 grounding grid: A ground terminal that uses a system of grounding electrodes such as interconnected bare cables and grounding plates buried in the earth.

53.15 ground plate: A metallic plate used as a component of a grounding terminal.

53.16 ground rod: A metallic rod used to form a ground terminal.

53.17 ground-rod clamp: A fitting that uses bolts or cap screws to secure a connection and is specifically designed to connect a conductor to a ground rod.

53.18 ground terminal: That portion of a lightning protection system extending into the earth, such as, a ground rod, ground plate, or loop conductor, serving to bring the lightning protection system into electrical contact with the earth.

53.19 loop conductor: A conductor that a) encircles a tree; and b) is used to interconnect ground terminals, main conductors, or other grounded bodies.

53.20 main conductor: A conductor that interconnects air terminals and serves as a downlead to ground.

53.21 metal body of conductance: A metal object located outside the zone of protection that is subject to a direct lightning strike.

53.22 metal body of inductance: A metal object located near a conductor and subject to a buildup of electric potential resulting from induced currents associated with lightning discharging through the adjacent conductor (side flash).

53.23 miniature tree points: Tree points designed for use with secondary-sized branch conductors.
53.24 radial conductors: Runs of multiple main conductor that connect a down conductor to ground terminals.

53.25 secondary (bonding) conductor: A conductor that connects metal bodies of inductance, such as a tree support cable, to the lightning protection system to eliminate the buildup of an electrical potential between them during a lightning strike.

53.26 shall: As used in this standard, denotes a mandatory requirement.

53.27 should: As used in this standard, denotes an advisory recommendation.

53.28 side flash: An electrical spark caused by differences of potential that occurs between conductive metal bodies or between such metal bodies and a component of the lightning protection system or ground.

53.29 striking distance: The distance over which final breakdown of the initial stroke to ground or to a grounded object occurs.

53.30 tree point: An air terminal specifically designed for use in trees.

53.31 tree support system: A support system used to provide supplemental support to leaders, individual limbs, and/or the whole plant.

53.32 underground metallic piping: Water service, gas piping, underground conduits, underground liquefied petroleum gas piping, or other buried utility service delivery system made of metal.

53.33 water-pipe clamp: A fitting that uses one or more bolts to secure the connection and is specifically designed to bond a conductor to underground metallic piping.

53.34 zone of protection: The space adjacent to a grounded air terminal or mast or overhead ground wire that is substantially immune to direct strokes of lightning. See Figure 53.34.

54 Lightning protection installation

54.1 Purpose

The purpose of this clause is to provide standards for writing specifications for lightning protection systems.

54.2 Lightning protection systems practices

54.2.1 Reasons for lightning protection systems

Lightning protection systems are used to safeguard trees from damage due to lightning.

54.2.2 Objective for lightning protection systems

The objective of a lightning protection system is to provide an alternate path to ground for the electrical charge.

55 Tree inspection

55.1 A qualified arborist or tree worker shall visually inspect each tree before beginning work.
Table 1 - Minimum requirements for Class I components

<table>
<thead>
<tr>
<th>Component</th>
<th>Construction</th>
<th>Diameter</th>
<th>Thickness</th>
<th>Attachment</th>
<th>Weight</th>
<th>Other Specification</th>
</tr>
</thead>
<tbody>
<tr>
<td>Air Terminal</td>
<td>Solid</td>
<td>3/8&quot; (9.5 mm)</td>
<td>0.032&quot; (0.81 mm)</td>
<td>3/8&quot; (9.5 mm) base end thread diameter</td>
<td>10&quot; (254 mm) long</td>
<td></td>
</tr>
<tr>
<td></td>
<td>Tubular</td>
<td>5/8&quot; (15.9 mm)</td>
<td></td>
<td>1/2&quot; (12.7 mm) base end thread diameter</td>
<td>10&quot; (254 mm) long</td>
<td></td>
</tr>
<tr>
<td>Air Terminal</td>
<td>Cast</td>
<td>3/32&quot; (2.4 mm)</td>
<td>0.061 (1.55 mm)</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>Stamped</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Conductor Supports</td>
<td>Cable</td>
<td>0.045&quot; (1.15 mm)</td>
<td>0.051&quot; (1.3 mm)</td>
<td>0.187 lbs./ft. (278 gm/m)</td>
<td></td>
<td>57.400 circular</td>
</tr>
<tr>
<td></td>
<td>Strip</td>
<td>0.045&quot; (1.15 mm)</td>
<td>0.051&quot; (1.3 mm)</td>
<td></td>
<td></td>
<td>area 1&quot; (25.4 mm)</td>
</tr>
<tr>
<td></td>
<td>Cable</td>
<td>0.045&quot; (1.15 mm)</td>
<td>0.051&quot; (1.3 mm)</td>
<td></td>
<td></td>
<td>width*</td>
</tr>
<tr>
<td></td>
<td>Strip</td>
<td>0.051&quot; (1.3 mm)</td>
<td></td>
<td></td>
<td></td>
<td>14 strands</td>
</tr>
<tr>
<td>Connector Fittings</td>
<td>Cast</td>
<td>3/32&quot; (2.4 mm)</td>
<td>0.061 (1.55 mm)</td>
<td>1/4&quot;-20 bolt/cap screw</td>
<td>4 full threads</td>
<td></td>
</tr>
<tr>
<td></td>
<td>Stamped</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

* Does not include width of perforations if so equipped.

57.5 Lightning protection system conductors shall be installed in compliance with minimum distance Table 1 in ANSI Z133.1 for overhead, energized conductors.

57.6 Existing steel support cables, guys and metal conduits in trees shall be bonded to the lightning protection system.

57.7 Down conductors subject to mechanical damage should be protected.

57.8 Soil type and the physical character of the surrounding area shall be considered before grounding the system.

58 Materials

58.1 Lightning protection systems for trees shall be made of materials that are resistant to corrosion or shall be acceptably protected against corrosion and meet or exceed the requirements of ANSI/UL 96A. The following material comply: A) copper of commercial electrical grade or B) a copper alloy with similar resistance to corrosion as copper.

58.2 A down conductor entering a corrosive soil shall be protected from corrosion by a protective coating for a distance not less than 3 feet (914 mm) above grade level. Down and radial conductors shall be protected for the entire length below grade.

58.3 Materials used to protect trees shall meet or exceed the minimum requirements for Class I components. See Table 1.

58.4 Aluminum hardware shall not be used in lightning protection systems for trees.

58.5 Incompatible metals shall not be used in combinations that form an electrolytic couple, except when bonded to the lightning protection system as required or recommended by this standard.

58.6 Conductors

58.6.1 Acceptable construction for conductors shall be rope lay, smooth twist, and loose-weave cable.

58.6.2 Conductor cable shall be stranded tightly enough to form a symmetrical cable and remain in a fixed position when installed.

58.7 Connector fittings

58.7.1 Connector fittings shall be constructed so that a minimum of 1-1/2 inches (38 mm) of each conductor can be secured within the fitting.

58.7.2 Cable splicers shall have at least two 1/8 inch (3.2 mm) high projections on the interior surface.

58.7.3 Installed connector fittings should withstand a pull of 200 lbs. (890 N).

Fig. 58.7 An installed cable splicer connector fitting.

58.8 Fasteners

58.8.1 Pinch-type fasteners shall be of substantial construction that can be closed by bending.

58.8.2 If attachment for fasteners is provided by a nail, it shall have a barbed shank and a minimum length of 1-1/2 inches (38 mm).

58.9 Ground terminals

58.9.1 Ground-rod clamps shall have a length that makes contact with the ground rod for a minimum distance of 1-1/2 inches (38 mm) measured parallel to the axis of the ground rod.
58.9.2 Ground-rod clamps shall have a minimum of two bolts, machine screws, or cap screws for applying compression.

58.9.3 Ground rods shall be a minimum ½ inch (12.7 mm) diameter and not less than 8 feet (2.4 m) long and shall be made of copper-clad steel, solid copper, stainless steel, or stainless steel clad.

58.9.4 Copper ground plates shall have a minimum thickness of 0.032 inch (0.8 mm) and a minimum surface area of 2 square feet (0.18 m²).

58.10 Water-pipe clamps

58.10.1 Water-pipe clamps shall have a length that makes contact with the utility pipe for a minimum distance of 1-1/2 inches (38 mm) measured parallel to the axis of the pipe.

59 Installation practices

59.1 Main air terminal point(s) shall be installed as high as practical.

59.2 One main conductor shall connect the highest air terminal to a grounding system.

59.3 No more than four secondary conductors shall be attached to one main conductor.

59.4 Multiple down conductors should be installed on opposite sides of the trunk or evenly spaced around the trunk.

59.5 Multiple down conductors should be interconnected.

59.6 Branch conductors shall connect air terminals located below the highest air terminal(s) to down conductors.

59.7 Multiple down conductors should be interconnected.

59.8 Branch conductors shall connect air terminals located below the highest air terminal(s) to down conductors.

59.9 Conductors should maintain a horizontal or downward course, free from "U" or "V" (down and up) pockets.

59.10 No bend of a conductor shall form an included angle of less than 90 degrees or have a radius of bend less than 8 inches (203 mm) other than at conductor junctions. See Figure 59.10.

\[ R = 8" (203 \text{ mm}) \text{ minimum} \]

Fig. 59.10 Bends in conductors.

59.11 Conductors shall not be coursed through the air without supplemental support for a distance of more than 3 feet (0.91 m).

59.12 Conductors shall not be pulled taut during installation.

59.13 Conductors shall be fastened to the tree at not more than 3 feet (0.9 m) intervals.

59.14 Steel cables or guys shall be bonded at the closest point to the lightning protection system.

59.15 A bimetallic connector should be used to connect metals that form an electrolytic couple, such as when bonding steel cables or guys to the lightning protection system.

59.16 Cable splicers or clamp-type (multi-use) connector fittings shall be used to form end-to-end, side-by-side, or "Y" splices in conductors.

59.17 Down and radial conductors shall extend away from the base of the tree. Down and radial conductors should be buried at 12 inches (0.3 m), except as specified in paragraph 59.30.

59.18 Radial conductors in sand or gravel soils shall extend a minimum of 10 feet (3 m) beyond the down conductor junction.

59.19 Ground rod connections shall be made with a ground-rod clamp, other clamp-type fitting (multi-use) that meets the specifications for ground-rod clamps, by welding, or by brazing.

59.20 Ground terminals should extend beyond the drip line of the tree. For trees with a drip line radius of 10 feet (3 m) or less, the ground terminals should be located at a minimum distance of 10 feet (3 m) from the trunk.

59.21 Ground terminals shall not be located within 2 feet of a structure's foundation wall.

59.22 Ground rods or plates in sand or gravel soils shall be located a minimum distance of 10 feet (3 m) apart.

59.23 Ground terminals should extend into the earth at a minimum depth of 10 feet (3 m) except as specified in paragraph 59.28.

59.24 The earth shall be compacted and made tight against the full length of the ground terminal.

59.25 The method of grounding shall be specified as one or more of the following types.

A. Vertical Ground Terminal

Fig. 59.25A Vertical ground terminal. Multiple down conductors shown.

B. Radial Ground Terminal

Fig. 59.25B Radial ground terminal. Fork configuration shown.
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Please circle 41 on Reader Service Card
C. Ground Grid

59.26 Vertical ground terminal
59.26.1 Single vertical ground terminals should be preferred.

59.27 Radial ground terminal
59.27.1 In areas where structures or obstacles prevent extending the down conductor beyond the drip line of a tree, radial ground terminals should be preferred. See Figure 59.27a “In-line” configuration.

59.27.2 “In-line” configurations should be used to minimize root damage.

59.27.3 In sand or gravel soils, radial ground terminals should be installed.

59.27.4 A minimum of two ground terminals shall be used in radial ground terminal configurations.

59.27.5 Ground terminals in a “fork” configuration should be interconnected.

59.28 Ground grid
59.28.1 In shallow top soils that prevent a ground terminal from being buried at 10 feet (3 m) depth, ground grids should be installed. See Figure 59.28.

59.28.2 In shallow top soils of 2 foot minimum depth, a radial configuration should be installed by burying each down conductor in a trench at least 12 feet (3.7 m) long and 2 feet (610 mm) deep in clay soil or 24 feet (7.3 m) long and 2 feet (610 mm) deep in sand or gravel soil.

59.28.3 Ground grid installation exception: If the methods prescribed in 59.28.2 prove impractical, the methods should be followed to the extent possible with each down conductor terminated by a buried copper ground plate.

59.29 Water-pipe clamps, or other clamp-type fittings that meet or exceed the specifications for water-pipe clamps, shall be used to connect metallic utility pipes to the lightning protection system.

60 System testing
60.1 Grounding of the system should be tested after installation.
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Accounts receivable is one of those problematic assets. Its total can give a tree care business a prosperous look. It tends to swell in summer, as crews are working at full speed to keep up with business. And because accounts receivable is part of various financial analyses, such as the current ratio, it adds an element of financial health to the analysis.

But how realistic is that? What does that total represent in terms of the likelihood of receiving money? How slow are those accounts? How collectible are they?

Any total of accounts receivable inevitably includes some slow accounts. The key—and the challenge—is to keep down both the number of slow accounts and the total dollars they represent.

The first step is to examine the individual accounts in detail. The starting point is to prepare a list (or schedule in accounting talk) called “Aging of Accounts Receivable.” This schedule sorts the various accounts, it indicates which accounts are late and how much money is past due. The basic format looks like this:

<table>
<thead>
<tr>
<th>Customer</th>
<th>0 - 30 days</th>
<th>31 - 60 days</th>
<th>61 - 90 days</th>
<th>over 90 days</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>past due</td>
<td>past due</td>
<td>past due</td>
<td></td>
</tr>
</tbody>
</table>

An account can appear in more than one category if a customer has more than one with you. Or, a customer who is making payments on account may be one month late with one payment, two months late with another payment, and so on.

Many company owners don’t consider an account in the first category, “0 to 30 days past due” as late. Accounts over 30 days past due need attention.

### How to collect slow accounts

Some managers regard collecting as the bubonic plague of business. If you’ve ever seen a Grade D western (“Widows and Orphans a Specialty”) you know why. But collecting doesn’t have to be hostile or unpleasant; that style is neither good collecting practice, nor is it particularly effective.

Effective collecting begins with formulating a consistent policy that includes a timetable for the billing sequence and collection activities. For example:

- 30 days late: second bill
- 45 days late: letter
- 60 days late: telephone call

Or:

- 30 days late: reminder letter
- 45 days late: telephone call

An effective policy stresses two main points:

- Take action before an account gets too old; at the same time keep in mind that premature action can alienate customers. Also recognize that most professionals, such as a property manager or golf course superintendent, don’t consider a bill late until it is over 30 days. As an owner yourself, what would you think of a vendor calling you when a bill is under 30 days? In some industries and businesses 30 to 45 day accounts are considered slow rather than late.

- Give the customer ample opportunity to pay, to state why he should not pay, or to communicate billing errors or other problems. Make it as easy as possible for the customer to clear the account.

### The letter

Collection letters vary in style. Some are chatty:

“Hi! I know you have a million things to do ...”

Others are less so:

“You have probably just overlooked this bill ...”

There are variations, such as:

“Why don’t you pay this right now so it won’t be one more thing for you to do later?”

A letter can serve as an inquiry as well as a reminder:

“We are concerned that there may be a problem with either the bill or our service. If we have made an error, or if you are not satisfied with our service, won’t you please bring it to our attention?”

A return envelope is a must; return postage is not, unless you provide return postage with all your billing.
Telephone calls

Some accounts eventually require a telephone call. Small tree care companies rarely outsource collections, so the job may fall on the owner or office staff with no training or inclination for collections. Not surprisingly, many business people avoid this, in part because they haven’t worked out a call that minimizes awkwardness. Making effective collection calls requires two things: having a pleasant telephone manner and knowing what to say.

The caller must sound pleasant on the phone. This doesn’t mean chatty, overly friendly, or unhealthily cheerful. You want to be business-like and sound as if you are smiling, which aren’t mutually exclusive. Take a deep breath before you begin the call, think of something pleasant, and smile.

You would smile at a customer in person. Do the same over the phone; it makes a difference. If you feel your voice and manner don’t come across well—and not everyone has that capability or talent—consider having someone else make your collection calls.

Asking directly for payment often makes the customer uncomfortable (not to mention the caller). A direct request tends to put people on the defensive and is usually unproductive. One of the best approaches is on the order of:

“I’m calling about our invoice dated June 3 for $978.28. I was wondering when you had it scheduled for payment.”

The second sentence is the key. It’s non-threatening. It assumes, of course, that the customer will pay, so there’s no suggestion of the customer being a deadbeat. The term “scheduled for payment” is non-personal and states the situation in terms of a procedure, which depersonalizes the situation and sounds positive.

This approach has a second major advantage: it forces a response. Few people will respond, “I don’t have it scheduled.” Almost everyone will reply by telling you when it might be possible.

“I’ve been very busy with school
graduations and vacations. I'm planning on writing that check this week.”

Or they'll make up a date as if they really did have it scheduled.

"I have it scheduled for the week of the tenth."

It may never have occurred to the customer to 'schedule' your payment, but he has to say something. And once said, a verbal commitment has been made. You might then follow up with "How about if I put you down for payment on the 12th?"

Chances are the response will be "All right."

You then say, "I'll make a note of it then," to further cement the commitment.

A good collector will push for a promise of something, even for a partial payment. "Could you pay us four hundred the week of the tenth?"

The follow-up is important so both parties will remember the amount promised. "Making a note" or "marking your account" firms up the agreement.

If the promised date comes without payment, what do you do? Wait a few days. A promise to pay on the tenth often translates to "I'll mail it on the 11th." If some time—and you determine what constitutes enough time—goes by, a second call may be needed. The tone is still pleasant, but the conversation may be more direct.

"Could you make half the payment this month and half next month?" Or, if it seems appropriate, "What schedule works for you?"

This addresses the problem but avoids any accusation of "You promised to pay but didn't."

You may resent having to "negotiate" for "your" money, but good collecting is just that. You're trying to find terms that work for both of you. You have to ignore the fact that if the customer had simply paid when he originally agreed, you would have the money and you wouldn't have to be going through this process.

Collection agencies

If your collection efforts continue to be unsuccessful, should you turn an account over to a collection agency? Agencies vary widely in their methods, attitude, and quality. Some seem to go out of their way to live up to every horror story that's ever been told about collection agencies. Others are proud of their responsiveness to both customers and debtors and try hard to show that there are human beings in the field of collection. If a collection agency seems to be the solution for you, take the time to shop for one that suits you. You may be surprised at the variety of approaches and styles. (Some collection agencies send thank you letters when payment is made.)


Keep in mind that a collection agency reflects your business. When you select an
agency you should consider very carefully what that agency's procedures and practices say about your business' attitude toward its customers.

Agencies also vary in their costs and methods of charging the customer. Some charge a percentage of the amount collected, some charge by the account, and some use a combination of these methods. As is often the case, the least expensive is not necessarily the best.

Collection agencies don't do anything that a business can't do for itself, but introducing an agency into the process gives the debt a different degree of seriousness beyond the fact the account is late. And you may have discovered over time that you hate doing collections yourself so much that an outside agency is the only way.

Uncollectible accounts occur in spite of the most careful policies and decisions. Sometimes even a good account "turns sour." When an account runs into trouble, invest in turning it around.

Monitoring accounts

Monitor your Aging of Accounts Receivable schedule every month to see if the number of slow accounts is increasing. An increase in accounts in one month or even two doesn't necessarily indicate a trend, but a pattern of regular increases in the number of slow accounts bears investigation. The increases may be due to:

1. Credit policies that are too liberal
2. Ineffective collection efforts
3. A changing market or economy (Consider not only the market your business operates in, but also changes in that market which affect your major customers.)
4. Seasonal factors: accounts typically are slow this time of year.

The first two factors are obviously more controllable than the third, but you'll want to consider the effect changes in the economy or market is having on your business. If these changes are inhibiting your collection efforts, it's time to focus more on liquidity and cash management.

Monitoring your aging schedule will also make your cash flow forecasts more accurate. For example, if you have $7,500 that is 91-120 days late, you're likely to collect only 1/3 or $2500 of that amount. If you're including the full $7500 in your cash flow forecast, your projected income is too high.

Dollar amounts can be skewed by a large account moving through the schedule. If one customer accounts for 25 percent of the dollar total, that one overdue account will produce big jumps in the totals as it moves from 31-60 days to 61-90 days, and so on. On the surface those increases might suggest worsening problems with collecting accounts, when in fact it's simply that one account moving through the system.
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Proper Planning For Tree Felling Excellence

When felling trees, here are just some of the potential hazards you must be concerned with:

1. The potential for the falling tree (trunk) to strike the chain saw operator or another crew member
2. The potential for the felling operation to dislodge hangers, dead branches or chunks of wood which could fall and cause injury
3. The potential for the falling tree to hit other trees or objects while falling, or to hit objects on the ground, which can in turn become hazardous to crew members
4. The potential for the falling tree to contact electrical conductors
5. The reactive forces of the chain saw used in felling
6. The force created by the release of tension on trees, tree limbs, or downed conductors
7. The felled tree that hangs up in an adjoining tree, or remains suspended off the ground, propped by its own limbs

Here are some of the more common conditions that you need to consider before beginning any felling operation:

- The size of the work area
- Terrain characteristics or other limitations of the work area
- The location and condition of other trees in the drop zone and within the felling radius
- The presence of lodged trees, hangers or large, dead branches in the tree to be felled or in trees within the felling radius
- The shape and weight distribution of the tree canopy
- Strength and other characteristics of the wood for the species of tree being felled
- The height and lean of the tree
- Tree diameter, to determine the length of saw bar and/or procedure in cutting
- Trees bent under tension (spring poles)
- Wind force and direction
- Decayed or other weak spots throughout the tree
- The possible presence of nails, wire, stones, concrete or other foreign objects in the tree
- The location and the means to protect people, property, and utility wires in the area of the tree


Though Colonial Tree Care and Signature Landscapes owner Oscar Richardson sees considerable activity in the landscape arm of his Chesapeake based business, the bulk of his work is taking down trees. And on the storm-prone Virginia coast, that means bringing down a lot of trees in a lot of residential neighborhoods. Colonial, which has been in business for 20 years, has 15 full-time employees on staff.

Richardson stresses that good communication, coupled with careful planning and preparation, are crucial to safe and efficient tree felling, especially in suburban and urban areas. “Before we begin any felling operation, our crew carefully checks out the tree and work site, looking for conditions that could potentially affect the outcome of the operation,” he says. “That’s when we identify any hazards on the site and our crew chief follows up with a work plan based on the tree and site assessment.”

Richardson’s staff then conducts a briefing before starting the job to clearly communicate the work plan to each crewmember.
“This plan sometimes needs to be modified if additional hazards are discovered after the work begins,” Richardson says.

The work plan and job briefing must be used to define clearly what each worker does and does not do in the operation. Also during the briefing, safety precautions are reviewed so that the amount of danger involved in the job is minimized.

Richardson follows this process for safe tree felling:

Workers directly involved in the felling operation (other than the chain saw operator) should maintain a distance of one felling radius at the time the tree is felled and until it is on the ground.

The suggested clearance is increased to twice the felling radius when a hazardous tree is felled.

Workers not directly involved in the felling operation should maintain a distance of twice the felling radius at the time the tree is felled and until it is on the ground.

The exception to the felling radius recommendation occurs when it is not possible to maintain clearance distances because of terrain or natural or man-made barriers such as backyard size, fences and houses.

In addition, Richardson uses a crew of two or more workers, depending on the situation. The work area must be clear of brush, undergrowth, or other obstacles that could interfere with escape. The saw operator must be able to quickly maneuver and escape. The preferable escape route is a line that is 45 degrees from either side of an imaginary line opposite the intended direction of the fall, and the planned escape route should be prepared before any felling cuts are made.

Richardson believes in the use of proper safety gear, saddles and ropes conforming with the ANSI Z-133 Standard. While Richardson’s crews have used a variety of chain saws, they prefer and do field testing for STIHL products. He also utilizes cranes on a frequent basis—a means, he says, of bringing down larger sections of a tree in a faster, safer manner.

Because of the inherent danger involved in tree felling, Richardson stresses that communication between the saw operator and the worker must remain open during the actual procedure. Other workers at the site must remain out of the work area to avoid distracting those who are doing the felling. Any worker leaving the tree’s felling radius must not re-enter until the tree is on the ground or the chain saw operator acknowledges the worker. And the saw operator must not deliberately fell a tree into another tree or across a tree or other object on the ground.

Richardson admits that there is a lot to think about when bringing a tree down in residential areas, and the methods described apply to arborists, not loggers, felling trees. “Loggers can cut a bed and have all the room in the world to drop in the middle of a forest. A logger stands on the ground and cuts and drops. Arborists drop from the top, piece by piece. It often takes a whole day to bring a tree down in a neighborhood because there are features found in a suburban area and not in the woods.”
TCI EXPO 2000, the largest arboricultural trade show under one roof, also offers attendees spectacular educational opportunities. The Expert Practitioner Series features the most current information on caring for trees and the Smart Manager Series concentrates on the details of running a successful tree care business. Two additional workshops on Wednesday, November 8, offer participants exposure to the latest in tree care research or details for successful business management.

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**Keynote Address**

**Expert Practitioner Series**
- **New Treatments: Claims, Theories & Results** - Dr. Bruce Braedrich & Dr. Thomas Smiley. Researchers from Bartlett talk about their ongoing projects and findings.
- **IPM in the Real World** - Dr. John Ball. How to market IPM and make a profit.
- **Rigging Challenges & Triumphs** - Don Blair. Laugh, think and take notes for your next job on some of the most difficult and intricate rigging jobs.
- **Carbon Allocation & Tree Care Treatments** - Dr. Don Marx. Understand how trees use carbon and the effects of treatments, pruning, root, storm & insect damage on plant health care practices.
- **Fertilization & Pest Control Strategies** - Dan Herms. Soil management regimes as part of IPM in urban landscapes and user-friendly decision tools for predicting pest outbreaks.

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- **Hiring From Other Cultures II** - Employee Panel. Listen to these panelists elaborate the needs of employees from diverse cultures.
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A Special Chain for You ...

By Tim Ard

Over the years, several of our projects have sparked interest and really created the need for saw chains for specific applications. I receive questions at least once or twice a month asking what type of chain works best for a certain specialty application. This article is to address some atypical

Safety and productivity require a sharp saw chain.

Rapco's carbide saw chain works well on wood with mud, nails or other abrasive.
In previous articles on saw chain and guide bars, we discussed the many different sizes and types of saw chain. It is quite a decision sometimes to select replacements at your saw dealer because of the sheer number of choices.

How should you handle those projects where standard chain just won’t “cut the mustard” so to speak? A few applications on the list of challenging projects might be:

- blown down or dried tree removals
- processing dried, dirt-covered logs for firewood
- stump removal
- burn area clean-up
- cutting railroad/landscape ties
- landlot brush removal

Working with any of these critical applications requires close attention to operator safety, chain wear and maintenance.

From a safety aspect, dull saw chain could increase the potential for accidents. It is evident with any equipment operation, fatigue is a major cause of accidents. Having to apply pressure to a saw chain to get it to cut is tiring, to say the least. In addition, when you have to push the saw to cut, just keeping control and balance can be a problem if you have to react quickly.

With some of the tasks mentioned above, reactive forces of the guide bar and saw chain can be accelerated to their maximum. Fibers of dried or creosote timbers are very hard, so the saw is subject to more vibration in the kerf. Also, be aware that unless you clamp or hold loose logs so they can’t roll or jump, reactive forces, especially kickback, can quickly overwhelm the operator, causing serious injury. You should be experienced in chain saw operation and/or seek the advice of an experienced operator before attempting any saw task, especially those involving cutting the materials above. For cutting dirty, hard, dried wood materials, I would recommend two chain types.

First, strive for maximum safety if all you need to do is make a dozen kerfs (saw cuts). A low-kick saw chain would be a good choice for work with brush or firewood (if the wood is not too dry or dirty). If you have a smaller saw, 3.8 cubic inches or less, it is most likely equipped with a reduced-kick saw chain. You will usually find your saw mounted with an extended-pitch, 3/8-inch chain or a .325-inch chain version. If your saw is an older one or it sports a larger profile 3/8-inch chain, Oregon Cutting Systems out of Portland, Ore., produces a new chain tooth concept called 72V. This chain sports a new design in the depth gauge (raker) area that reduces the rotational reactive force to small saw standards, yet bores and cuts like a professional chain.

What about those dirty wood surfaces? If you make just a couple cuts in a treated railroad landscape timber, your chain is...
dulled beyond its ability to cut. You apply pressure but no chips result. If you were only going to make a few cuts, then I would only recommend frequent sharpening. But what if you are in landscape construction and cut a lot of ties? And what if you regularly remove and buck a lot of deadwood, stumps or perform other dirty wood tasks? Some tree care companies may do these tasks several times a month—others daily. So much sharpening makes for dull work! Instead, you may want to try one of the carbide saw chains on the market.

I assisted with a study a few years back on a couple loops of carbide tipped saw chain. In old dirty ties, we could make over 200 kerfs (cuts through the material) without sharpening. With a regular saw chain, 25 kerfs were all we could make, and even then only if we really selected the cleanest spots to cut. During another test trial with Rapco carbide saw chain, a friend and I processed close to 100 loads of firewood with only one sharpening. The teeth were still in good shape by the end, but the chain chassis was worn, so we retired the chain. The Rapco was a real time and cost saver in this case because most of the logs were acquired from logging jobs. Dried mud filled the bark, making it very abrasive to saw chain. Standard saw chain would not have been as cost effective.

Carbide saw chain is a bit more expensive than standard saw chain, and it must be sharpened with special grinding equipment (at close to the cost of a standard saw chain for each sharpening). It is very cost effective, however, for those dirty wood tasks where cut after cut is needed to complete the job.

Remember, too, most carbide saw chain is built on a converted standard 3/8-inch or .404-inch saw chain chassis. Wear should be checked on a regular schedule and special consideration must be taken with regard to reactive forces. Only experienced saw users should use carbide chains.

With proper planning and selection of low-kick designs or carbide saw chain, safety and productivity can be increased in your special chain saw applications. Those hard-to-handle tasks can be a little more endurable. Make certain that proper PPE is used at all times, especially head, eye, ear and leg protection when operating chain saws.

So, here’s to a special chain for you!

Tim Ard is president of Forest Applications Training, Inc. and is a nationally known professional chain saw applications instructor. If you would like receive more information or have questions answered regarding chain applications send a note to Forest Applications Training, PO Box 1048, Hiram, GA 30141 or e-mail to timard@forestapps.com or visit http://www.forestapps.com.
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When I first started doing tree work 26 years ago, I was taught to prune a tree by removing all the interior growth and dead wood. This left bare branches with growth only at the ends. I noticed trees that had been pruned extensively died. This made me think about the terms “tree care,” “tree service,” and “arbor care.” These terms, at least to me, suggest something good is going to happen to trees. But stripping out the inside of a tree and calling it pruning is not tree care—even though it is still being done today.

Photosynthesis and transpiration hence translocation are impeded by this type of pruning. I observed trees that had been “cared for” or “served” by pruning and the leaves at the ends of the branches were smaller and sometimes yellow or orange, due to a nutrient deficiency called chlorosis. Trees displaying chlorosis have a harder time translocating the nutrients from the roots to the extremities of the plant. Also, the removal of branches with photo arrays (leaves) limits photosynthesis, and photosynthesis is what trees are all about, making sugars or carbohydrates that feed and give energy to the tree.

Stripping out the inside of a tree and calling it pruning can set up the tree for storm damage. In trees that are not stunted by this type of pruning, growth happened only at the ends of the branches, putting weight where it can do the most damage, exacerbating a tree’s vulnerability to wind and ice storms. I have seen trees completely torn up by the weight of their own foliage. The leaves were no longer balanced or evenly distributed.

Stripping out the inside of a tree and calling it pruning opens entrance points for pathogens such as anthracnose on dogwoods or ash blight.

Stripping out the inside of a tree and calling it pruning makes the sun shine where it shouldn’t. When the temperature goes over 90 degrees, the exterior leaves shut down and all that other stuff happens in the interior, shaded sections of the tree.

Stripping out the inside of a tree and calling it pruning is terribly unimaginative. On the up side, any idiot can do it.

Stripping out the inside of a tree and calling it pruning or lolly-popping (removing the lower growth) can ruin in a moment what took the tree years and years to accomplish (grow).

Stripping out the inside of a tree and calling in pruning strips the character and individuality from these sometimes-ancient living gifts.

When you hire someone who will be “caring” for your client’s trees, be careful of the word PRUNE; it is ambiguous and requires interpretation. It is better to say exactly what you want done. You want your tree “dead-wooded” and over-extended leaders reduced or cabled. Dead-wooding is important because it removes glucose-seeking fungi and makes trees healthier. If the plant is congested, removing live branches can be good too. But, like a good haircut, you don’t want to know it happened.

Be careful of the word PRUNE. That is the best way to “care” for your clients.

Geoffrey Dodge is owner of Pound Ridge Tree Service in South Salem, N.Y.
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<td>5) 1998-1990 GMC &amp; Ford Crew Box, Chipper, Dumps, Diesel, Good condition, Starting @ $11,000</td>
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<tr>
<td>1) 1984 John Deere Model 540 Skidder, Asplundh Bucket 50' w.h., Very Good Rubber and Mechanical Condition, $20,000</td>
</tr>
<tr>
<td>4) L-Box 16' Chipper Dumps, 89-91, Ford / GMC, Starting at: $17,500</td>
</tr>
<tr>
<td>2) 1999 International 4700, 466E Diesel, Low with 6 spd, 55' w.h. Aerial Lift of Conn. Bucket Truck, Complete Forestry Package, As New Cond., 5,000 Miles Choice, $70,000</td>
</tr>
<tr>
<td>3) 1986-1993 Ford F-700 Diesel, 55' w.h. Aerial Lift of Conn. Bucket truck, Very Good Cond., Starting At: $37,000</td>
</tr>
<tr>
<td>7) 1997-98 Woodchuck Model WC17, Self Feeding Disc Wood Chipper, Diesel, Low Hours, Starting at: $12,500</td>
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**TREE CARE INDUSTRY - JULY 2000**

85
Measuring Fine Root Growth

By Dr. Donald H. Marx

A core of soil 3 inches in diameter by 8 inches deep is removed from the test area with a soil core extractor.

Introduction

Most problems of landscape trees and other woody plants start with the root system. Unfortunately, unlike the above-ground parts, the root system is the most difficult to observe and study, frequently requiring massive soil excavation and tree destruction.

Root systems of woody plants consist of long-lived, large perennial woody roots that produce many relatively short-lived, fine (less than 1/12 inch diameter), non-woody roots, including mycorrhizae. The function of non-woody fine roots and mycorrhizae is mainly the absorption of mineral elements and water from soil; woody roots absorb water but little mineral elements.

The most vigorous trees have the largest expanse of woody roots into large soil volumes and have the greatest density of non-woody roots and mycorrhizae in this
soil volume. Non-woody fine roots may only represent 5 percent of the total root weight of mature trees but can account for over 90 percent of the total root length. Death and replacement (i.e. turnover) of non-woody roots occur simultaneously. Non-woody roots are sloughed from lateral roots as lateral roots continue to elongate and mature. Annual estimates of fine root turnover range from 30 percent to 90 percent. On very poor forest sites, non-woody fine roots may turn over two to five times a year. Fine root production of mature trees on poor quality sites may represent up to 50 percent of a tree's total annual growth, while on good quality sites, this root production may represent only 25 percent of the total annual growth. More roots than tops (leaves, branches, etc.) are routinely produced by trees growing on stressed sites that have limited soil resources.

Mycorrhizal development on fine roots increases the longevity of their functions. Most non-mycorrhizal fine roots of trees persist for less than two months before sloughing, desiccating or being destroyed by pathogens or grazers. Mycorrhizae may persist for several months. It is necessary to bear in mind that while the life of these non-woody roots is relatively short, the lateral roots continue to develop through the growing season and continuously produce more fine roots.

There have been many methods devised to study fine roots of trees of different sizes. Rhizotrons—which use sheets of clear glass or plastic in the soil profile for roots to grow against—have been used. They have limitations, however, because of their cost, size and permanency. Mini rhizotrons use clear vinyl tubes placed in the rooting zone of trees and a miniature video camera placed in the tube to record root growth against the tube. The problem with this procedure is the limited size of the field of observation. Randomly collected cores of various soil volumes have also been used to study fine root turnover on trees in forests. The problem with this method is that it's difficult to determine when the roots collected in the core samples actually developed.

Another method to study the periodicity of fine root growth into a specific volume of soil was initially developed the USDA Forest Service and Department of Energy. The procedure used root ingrowth cores (RIC's), which are 3-inch diameter, perforated, rigid plastic tubing cut 8 inches long. Perforations are 3/16-inch x 3/16-inch holes in the walls of the
A root ingrowth core (RIC) is placed in the hole.

The RIC is filled with the soil from the extractor after screening to remove all roots.

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Steve Giest, arborist, Swingle Tree Co., Denver, Colorado

After a specific period of time (two to six months), the outside edge of the RIC is cut with a knife to cut roots which grew into the RIC.

Dr. Donald H. Marx is chairman and chief scientist of Plant Health Care, Inc. RIC’s can be obtained from RICK/MARX, 775 Eddings Point Road, Frogmore, SC 29920.
The soil in the RIC is emptied into a screening basket and the soil is separated from the roots. Roots that are collected in the screening basket developed since the RIC was placed in the soil. For more information...


The soil in the RIC is emptied into a screening basket and the soil is separated from the roots. Roots that are collected in the screening basket developed since the RIC was placed in the soil.
Bacterial Leaf Scorch:
Searching for Cures

Dr. James Sherald

Most arborists are familiar with leaf scorch and decline, which can be caused by drought stress, confined growing spaces, lack of moisture, salt damage and just plain stress. Another cause of leaf scorch is associated with a bacterial pathogen—Xylella fastidiosa.

The name is significant.

- *Xylella*, because this is an organism that is found exclusively in the water-conducting tissue of a tree.
- *fastidiosa*, because this is an organism that is very difficult to isolate and grow in a culture.

Death of the oak leaves along margins in midsummer is an early symptom of bacterial leaf scorch.

Battling in the Community

A small, well-established community in Delaware tried to save its mature trees. The tree care company had been doing an excellent job caring for these trees. In spite of all their efforts, they continued to get leaf scorch, and die back, and many of them had to be removed. We eventually confirmed *Xylella fastidiosa* was causing leaf scorch in this planting. They did a survey and found that of the 350 trees, at least 50 percent were infected, and about 20 percent of them were showing symptoms involving 50 percent or more of the crown.

Constitution Gardens in Washington has about 120 red oaks that are about 25 to 30 years old. Twenty percent of them are showing symptoms of leaf scorch.

Death of the oak leaf progresses toward the petiole, where a "water-soaked" zone between live and dead tissue is seen.
Leaf scorch causes marginal discoloration, often with a reddish brown band. It migrates toward the major veins of the plant. The disease causes a chronic decline in the tree, which does not die immediately but over a period of years.

The major trees affected by leaf scorch are elm, sycamore, maple, mulberry and oak. It is important to recognize that although these diseases are caused by Xylella, there are different strains or pathovars involved. Not all strains affect all species. We know, for example, that elm and sycamore are affected by different strains.

Sycamore leaf scorch, like the other diseases, is pretty common in the Mid-Atlantic, along the Gulf Coast and in the southeastern parts of the United States. Xylella does not thrive in northern climates. It is most prevalent in the South, Gulf Coast, Texas, and southeastern part of the United States. You will find it in New Jersey and northward, but it is nowhere near as significant a problem as in Georgia, for example, where it has been estimated that more than 50 percent of urban trees are affected. Interestingly, shade trees do not seem to be affected in California. It may simply be a strain issue, but I haven’t seen reports of Xylella in sycamore, elm or any other shade tree host in California.

The National Park Service manages about 2,500 elms in the heart of Washington. There are 600 located on the National Mall. We have about a 30 percent disease incidence on the elms on the Mall. Fortunately, only about 5 percent of the trees are showing symptoms to the degree that 50 percent of the crown or more is affected, but it is a major issue for us. The symptoms are quite distinct, with an undulating marginal necrosis preceded by a chlorotic halo. It gets progressively worse as it migrates toward the mid-vein. Symptoms progress in severity from the older leaves out to the younger leaves, which are only moderately affected, or maybe not affected at all. Leaf curl is another common symptom of elms affected by leaf scorch.

The symptoms of leaf scorch are easily confused with other diseases, such as Dutch elm disease and oak wilt, not to mention stress. Many times Xylella is misdiagnosed as something else. Fortunately, we have a serological test that is easy to run. Agdia Diagnostic Company makes a kit that you can buy, or you can ship them a sample. It is important when you are working with this organism in a new area that you confirm it—at least on a few trees, so that you can be reasonably sure that this is, indeed, the pathogen. It certainly is not necessary to do it on every tree.

If you are not familiar with this disease, you might mistake it for Dutch elm disease. They look similar, but there are some distinct differences. Dutch elm disease usually presents itself early in the spring, whereas all of the leaf scorch diseases do
not begin to show symptoms until mid- to late-summer, starting in mid-July usually. The other significant factor is that Dutch elm disease is an acute disorder that will kill a tree in a couple of years, whereas leaf scorch disorders are a chronic problem. Trees with this disease get progressively worse over a very long period. Also, leaf scorch causes no vascular discoloration, as you would see in Dutch elm disease.

Typically, what you see in a landscape are groups of trees that are severely affected and other areas where branches or whole sectors of trees are not showing any symptoms at all. Later on, as these trees get progressively worse, there is a lot of dieback. As you would expect with trees under chronic stress, opportunistic fungal pathogens and insects take advantage of weakened trees. In the end, you have to remove the trees. Rarely does the disease kill trees outright, but it gets to the point when they are no longer contributing to the landscape.

Elms affected by leaf scorch become highly attractive to the bark beetle that transmits Dutch elm disease. We have found that elms weakened by leaf scorch are about 12 times more likely to contract Dutch elm disease than trees that do not have leaf scorch.

Oak is probably the host of greatest concern. We now have a dozen oak species that are affected by leaf scorch, and more are being added all the time. The most recent addition is the Blue Jacko from Florida. A survey in Florida found that six or seven species are affected. We used to think just red oaks were affected, but now we see it also affects oaks in the white oak group.

Unfortunately, the area we know the least about with Xylella is what to do about it. What we recommend is that you prune it out whenever you see it on an individual branch. The problem is image pruning. Dutch elm disease leaves streaks, so you know that if you get 10 feet beyond the vascular discoloration you will have about a 90 percent chance of saving the tree. In dealing with Xylella, you can see the symptoms in one place but you really don’t know how far that organism is distributed in the tree. As a result, you really have no guide as to where you should make your pruning cut.

There is a therapeutic treatment with tetracycline, registered under the trade name of Mycoject, sold by J.J. Maugut Company. In our experience, treatment with tetracycline will provide relief of the symptoms for a year or two, but it is not a cure. Tree life can be extended indefinitely, however, and by improving general tree health at the same time we can keep these trees alive. We need a lot more research on different materials and mechanisms of injections before we can conclusively recommend anything for long-term control.

The best thing we can say intuitively is that anything you can do to improve the overall health of the tree is probably going to prolong its life, and may help overcome some of the secondary problems that affect the tree. Whether or not you can overcome Xylella with management practices remains to be seen.

Dr. James Sherald is a plant pathologist with the National Park Service. This article was excerpted and adapted from a presentation at TCI EXPO.
Insect Transmission

By Dr. Jo-Ann Bentz

When we started studying insect transmission of leaf scorch a few years ago, we had no idea what insects were involved when it came to landscape trees. People have studied *Xylella* and insects in relation to crops such as grapes, peaches and plums, but most of these insects are not common on landscape trees.

We set up traps that we changed every other day for two years. In the end, we collected over 60,000 insects. We have identified about 100 different species—including spittlebug and leafhoppers—associated with infected trees. Many of the species that tested positive for carrying the bacteria have never been associated with *Xylella* before. We found three different species of leafhoppers that tested positive as possible vectors of *Xylella*, and they are a very common insect in oaks.

At this moment, I regret to inform you that we have no strategy for controlling these species. For the time being, we are stuck with the same old problem. Many high-value specimen trees are succumbing to *Xylella*. Infected trees are becoming unsightly and unsafe. Many of you are facing this situation. We have no cure for infected trees, nor a strategy for preventing infection, only treatments to slow the disease until a cure arrives.

Dr. Jo-Ann Bentz is a research entomologist with U.S. Department of Agriculture.
How Will We Get Bucket Trucks up There?

A group of scientists say trees will play a role in any future human colonization of Mars or other distant planets. Genetically engineered trees that could withstand the extreme temperatures on Mars could then begin producing the oxygen humans would need to live on the red planet, scientists were quoted as saying.

The scientists, who were speaking at a forum examining the future of NASA, noted that trees probably helped make the environment on earth safe for humans after purifying what was once a hostile environment for millions of years.

Florida Arborists Chase Canker

Among the busiest arborists in the country this spring are those in southernmost Florida, where an outbreak of citrus canker has state agriculture officials on high alert. In a single week, officials in the cities of Margate and Coral Springs marked more than 400 trees for removal.

To keep the disease from spreading, officials are ordering all citrus trees within 1,900 feet of a diseased specimen removed. At one point, eight tree crews were working in two Florida counties, cutting a combined total of nearly 160 trees each day, according to a story in the Miami Herald.

Workers had to be extra careful not to spread the disease, which officials want to keep a safe distance from the massive groves of oranges and grapefruits that populate the area just to the north of Miami. Crews carried anti-bacterial soap in spray bottles, washing not only saws and other tools, but their shoes—and those of anyone who walked near a diseased tree.

The mandated removals are a blow to many homeowners in southern Florida, where the ability to grow citrus trees for shade and fruit is considered one of the benefits of living in the area. To compensate, the state is giving each homeowner a $100 voucher to buy replacement trees.

A Dream Come True?

Chances are that every arborist who has ever ended the day with a pile of brush, a truckload of chips or a load of mediocre logs has dreamed that even waste wood might someday be valuable. And if an experiment in British Columbia, Canada, is a success, it just might be.

Dynamotive Technologies Corp. recently announced that it would invest $4 million to construct a plant capable of producing as much as 10 tons of oil a day from waste wood provided by the region’s saw mills.

According to a story in the Vancouver Sun, the principals of Dynamotive say their BioOil comes from the volatile oils present in trees and other flammable plants, including sugar cane.

BioOil is being touted as environmentally friendly, because it doesn’t produce greenhouse gases and eliminates the need for sawmills and others to burn waste wood, which adds carbon dioxide directly to the atmosphere.

A Dynamotive executive might have been providing the seeds for sweet dreams for arborists everywhere when he said: “BioOil represents an opportunity to convert that waste into a relatively high-value product.” Of course, there is a catch. The so-called “green oil” is low-octane and can only be used in stationary engines, such as generators.

Parts of 300-Year-Old Oak Headed to Sea

Of course, there’s more than one way to recycle a tree. For a 300-year-old oak recently taken down in Ocean Springs, Miss., this could mean becoming part of history.

According to a story reported by the Associated Press, property owner Steve Metz had the tree removed after several limbs fell and damaged a neighbor’s roof and vehicles. Metz said parts of the tree were being shipped to Boston, where the USS Constitution is undergoing repairs. That ship, built in 1794, is the oldest commissioned warship in the US Navy’s fleet and a top tourist draw in Boston, where nearly 1 million people step aboard each year. The ancient oak was sought out by repair crews in an effort to match the grain and other characteristics of the original ship.
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A bad day or an incredibly lucky day—it all depends on how you look at it. I was badly bruised with 25 square inches of severe scrapes, third degree rope burns and a bad headache. But I could have required an aerial rescue or ended up paralyzed after being beaten up and hung upside down 80 feet up a tree.

The huge tree needed to come down. One limb in particular worried me the most. It had been dead for long enough that the bark was peeling, it was partially hollow and extended 30 feet over the house. It was 16 inches in diameter where it met the main stem, growing at a 45-degree angle and about 50-feet long. I climbed halfway out onto 10-inch wood, strapped on and tightened my climbing line. I ran the lowering line through a crotch over the lawn and rigged a second line near the base of the cut to slow the swing down. With this and a little luck, the limb wouldn't shatter and land on the house or the busy street 50 feet away. I gave instructions to my groundmen then made a notch cut to direct the limb to the left. Needless to say, things don't always go according to plan in tree work. I had four inches of the backcut to go but the hinge cut didn't work—the limb came straight down with the rope on the wrong side of the limb—my side. My men did just as I instructed: "Let both ropes run about 15 feet and then slowly stop them." Unfortunately—the rope was hooked under my chin and slammed me backwards until my head hit the limb below my feet. Fortunately—my left spike peeled out allowing me to pivot instead of breaking my back.

I was clutching a chain saw at full throttle, which flung back and forth as I instinctively tried not to drop it. Fortunately—no flesh made contact with the chain.

I lay upside down, dazed and confused. My pole strap was tight around my folded right leg and the limb, while my climbing line pulled the saddle in the other direction, elevating my torso slightly above the limb. My arm was pinned by the lowering line and I couldn't slide my arm out from under it without dropping the saw, which was now idling (duh—release the trigger finger).

An eternity passed as I looked "up" at my men on the ground. I noticed chunks of skin hanging off my forearm, sensed the pain in my back and the throbbing in my head. And boy, did the rope burn under my neck and on my arm smart. For the first time in my life I was in big trouble and no one could help me anytime soon. I collected my strength and struggled to release some of the tension on the taught line. Then I struggled some more to free my leg and get back into an upright position.

The limb was hanging over the house, not over the lawn as planned, so my men couldn't let it down. I yelled at my men (as if this was somehow their fault) to tie off one of the lines and get the crane hook over to the limb. Fortunately—the limb was within reach of the 80-foot boom so they could pick it off. All I had to do was get to it and do some rigging.

I collected myself and decided that none of my injuries needed immediate attention. The 150-foot climbing line was too short to get me to the ground without re-crotching—and I knew I wouldn't get paid if I didn't finish the job—so the show went on. The rest of the job looked easy; only three more live branches to lower, then the rest would be within reach of the crane. The remainder of the job went well, and I reached the ground grateful and wiser.

In hindsight, I'm sure another crewmember with a pull rope would have made things safer and easier. It's a dangerous business we're in. Discuss the "what ifs" with your crew and drill for aerial rescues. Charge enough so you never feel you have to rush. Be prepared and you can rule the day.

The author is the owner of a small, well equipped tree care company in Westchester County, N.Y. that specializes in removing large trees in difficult spots.

Do you have a story From the Field?

TCI will pay $100 for published articles. Submissions become the property of TCI and are subject to editing for grammar, style and length. Entries must include the name of a company and a contact person.
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Sherrill Arborist Supply is a company focused on customer service and order accuracy. Our large inventory assures quick delivery and low prices second to none! Member and active supporter of National Arborist Association (NAA), ISA and ArborMaster Training. Williamsburg, VA 757-229-8820; Charlotte, NC 704-598-9898, and Greensboro, NC 800-525-8873. Fax: 336-378-1096; E-mail: sherrillarbor@att.net; Web: www.wtsherrill.com.
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For further information, contact Bandit Industries, Inc., 6750 Millbrook Road, Remus, MI 49340. Phone: 800-952-0178; Fax: 517-561-2273; E-mail: BRUSHBANDIT@ELIPSETEL.COM; Web: www.BANDITCHIPPERS.COM.

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Fox Stump Routers feature 35-year proven design, impressive speed and depth capabilities exceeding 12 inches. Chips are retained under machine, great maneuverability, easy loading and unloading quick-change cutter head, 25 hp Kohler engines. Low cost to purchase, and maintenance is primarily sharpening your teeth and many, many happy customers. All this backed by a great warranty. Video on request. Financing Available. Fox Manufacturing, Inc., PO Box 6, Lowell, IN 46356. Phone: 219-696-1440; Fax: 219-696-8107, E-mail: fox@netnitco.com.

LEONARDI MANUFACTURING

Manufacturer of stump grinder teeth and pockets, including the new TOMAHAWK™, the highest performance tooth on the market. Other products include the new Ultimate Pocket™, heat treated pockets, pin teeth, new style bolts, brush chipper knives and anvils (we distribute Simonds knives), files for chain saws, band saw blades. Call for free catalogue. “Quality since 1945.” Leonardi Manufacturing Company, Inc., 2728 Erie Dr., Weedsport, NY, 13166-9505. Phone: 315-834-6611; Fax: 315-834-9220; E-mail: leonardimfg@worldnet.att.net.

MILLER MACHINE WORKS

Stump grinding attachments for use on tractors and skidsteer loaders. Using your tractor or skidsteer as both power source and tool carrier provides the lowest cost per delivered horsepower on the market ... by far! When combined with a tractor, front-end loader or skidsteer bucket, then stump removal, back filling and wood handling becomes a one-man mechanized job. Eight models are available from 24 to 150 horsepower. All are professional-grade machines with simplicity, durability and high productivity. Miller Machine Works, 3309 East Washington Avenue, Frankfort, IN 46041. Phone: 765-659-1524; Fax: 765-659-0613.

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Only Rayco makes a complete line of stump cutters from 13 to 275 HP. Worldwide, Rayco stump cutters command amazing popularity for their high profit earning performance and superior value. Either gasoline or diesel powered, each Rayco model (including the RG 50, shown) has special features that increase productivity while enhancing operator safety at a minimal labor cost. Rayco Manufacturing, Inc. Phone: 800-392-2686 (US & Canada). E-mail: rayco@raycomfg.com; Web: www.raycomfg.com.
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ACECAP® and MEDICAP® tree implants are the industry's lowest unit cost for prepared dosage systemics. We offer a complete product line, including insecticide, fertilizer and micronutrients. This unique application technique reduces time and labor, and there are no container disposal worries. Implants are available from an independent distributor network. Creative Sales, Inc., (CSI), PO Box 501, Fremont, NE 68026. Phone: 800-759-7739; Web: www.aceap-medicap.com.

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CLEARY CHEMICAL

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Since 1941, we have manufactured the leading brands of soluble fertilizers and kept ourselves current on tree nutrition and fertilization research. Not only do we strive for the optimum in formulating the finest product for the tree, but also to make the most suitable product for the tree health professional. (Soil-applied mycorrhizal spores). Free catalog available. The Doggett Corporation, 31 Cherry Street, Lebanon, NJ 08833. Phone: 800-448-1862; Web: www.DOGGETT.NET.

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The Mauget HOME STUDY COURSE is a comprehensive package of Mauget Educational Materials enabling those who may not be able to attend a Mauget Educational Seminar or just want to keep UP TO DATE. The package includes: A four videotape training program and the Mauget Applicators Manual containing product labels, MSDS, the certification examination, and more! J.J. Mauget Company, 5435 Peck Road, Arcadia, CA 91006-5847. Phone toll-free: 800-TREES-RX (873-3779) or 626-444-1057; Fax: 626-444-7414; E-mail: mauget@mauget.com; Web: www.mauget.com

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Specializing in quality liquid tree and shrub fertilizers, spray adjuvant, anti-transpirant, soil amendments, natural Plant Wash and the Kioritz Soil Injector. NU-ARBOR fertilizers are uniquely blended to enhance vigorous root growth and improve plant/soil relations. Apply our liquid fertilizers with the Kioritz soil injector or your high pressure system. For a free video and product information, contact NU-ARBOR Products, PO Box 151455, Grand Rapids, MI 49515-1455. Phone: 888-773-8777; Fax: 616-456-7780; E-mail: grdarbor@nu-arbor.com.

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Mycorrhizal fungal inoculants, beneficial bacteria, biopesticides and organic fertilizers round out the extensive product line of Plant Health Care, Inc. These biologically based products are designed specifically for arborists who follow the Plant Health Care Management System. To order MycorTree™ Injectable or Root Saver™ Vertinulch, Mycor™ Palm Saver, PHC™ BioPak™ or other products, call 1-800-421-9051 for a Garden For Life catalog. For in-depth information about natural systems approaches to arbor care, to read the Web’s best online magazine about plant health, and to order products online, go to www.planthealthcare.com. Plant Health Care Inc., 440 William Pitt Way, Pittsburgh, PA 15238.

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Manufacturers of patented products for professional or homeowner use with new trees, shrubs and rose transplants. Delivers a specially formulated fertilizer already inside the product directly to the root ball of the plant when you water. Serves time, water and labor; no mixing, no measuring. Check out our new “Kick Start” products for the homeowner. Tree Feeder Division, PO Box 974, Warsaw, IN 46581-0974. Phone Toll-Free: 800-822-8733. Visit our Web site: www.treefeeder.com.
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Cost-effective pesticide and nutrient injection technology for insect and disease treatments, as well as nutrient amendment. Tree Tech® OTC for fireblight and other bacterial diseases in crop and non-crop bearing fruit trees. Vivid II for scales, aphids, mites and other pests of ornamental trees. Many other products available. Tree Tech Microinjection Systems, 1879 SW 18th Avenue, Williston, FL 32696. Phone: 800-622-2831 or 352-528-5335, Fax: 352-528-0777, E-mail: RWEBB@TREETECH.NET; Web: www.treetech.net.

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Lightning protection systems for trees, golf shelters, restrooms, clubhouses, maintenance buildings and secondary lightning surge protection for sprinkler systems. Tree lightning protection sales and installation kit available along with VHS, "How to Install Lightning Protection in Trees." Free computer estimating program provides itemized material list for a specific tree. Independent Protection Company, PO Box 537, Goshen, IN 46527. Phone Toll-Free: 800-860-8388 or 219-533-4116; Fax: 219-534-3719; E-mail: info@ipclp.com; Web: www.ipclp.com.

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For 32 years, our business continues to specialize in refurbishing arborist equipment and warranty used equipment. Sales of brand new equipment. Privately owned by Pete Mainka and his wife, Shirley. Average inventory of 400+ trucks. Unique financing programs to take care of all needs. New parts available. Custom building of chip boxes, as well as completed specialized forestry packages. Pete Mainka Enterprises, Inc., 633 Cecilia Drive, Pewaukee, WI 53072-2542. Phone: 262-691-4306; Night Phone: 262-968-9763; Fax: 262-692-4644; Toll-Free: 800-597-8283.
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BANDIT INDUSTRIES, INC.

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Introducing The Timberwolf TW-PRO-HD with Top Roll technology—by far the best value for the buck. The patented top roll clamp system provides the fastest firewood production available. Easily handles irregular wood, and handles the last piece where other machines lose their grip. Professional wood splitters and conveyors. Timberwolf Manufacturing Corporation, 118 Spruce Street, Rutland, VT 05702. Phone: 800-340-4386 or 802-775-4227; Fax: 802-773-1275; E-mail: twolf@sover.net; Web: www.timberwolfcorp.com.

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<td>172. Fox Manufacturing, Inc.</td>
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Deer Creek Equipment Inc.
J.P. Fuller Inc.
McDonald Equipment Company (MECO)
Northeastern Associates
Pacific Arborist Supplies (Canada) Ltd.
Pitt Auto Electric Company
Tree Tools

Grapples / Loaders
Crane & Shovel Sales Corporation
Deer Creek Equipment Inc.
Hollie Wood Enterprises
IpleMax Equipment Co., Inc.
Lund Tech, Inc.
Lyons Sawmill & Logging Equipment & Supplies, Inc.
Payeur Distributions Inc.
Southeastern Equipment Company
Vermeer Manufacturing Company

Grinders, Tub
Alexander Equipment Company Inc.
Bandit Industries, Inc.
Cummins Michigan, Inc.
Fecon, Inc.
Morbark, Inc.
Vermeer Manufacturing Company

Grinders, Horizontal
Bandit Industries, Inc.
Fecon, Inc.
Morbark, Inc.

Hydraulic Tools & Equipment
ADI Pruning Tools by TOL Incorporated
Bishop Company
CUES, Inc.
Deer Creek Equipment Inc.
Ditch Witch of the Carolinas
Karl Kuemmerling, Inc.
Midwest Arborist Supplies
NESCO, Inc.
Professional Tree Surgeons Supplies Inc.
Racine Hydraulic Tools/FCI
WesSpur, LLC

Knives, Chipper
Alexander Equipment Company Inc.
American Arborist Supplies Inc.
Arborist Supply Company Inc.
Cleaves Company, Inc.
Crane & Shovel Sales Corporation
CUES, Inc.
Droge Equipment
ESSCO Distributors, Inc.
Karl Kuemmerling, Inc.
Lanphear Supply
Lyons Sawmill & Logging Equipment & Supplies, Inc.
Midwest Arborist Supplies
Northeastern Associates
Pacific Arborist Supplies (Canada) Ltd.
Professional Tree Surgeons Supplies Inc.
Shelter Tree, Inc./Tree Care Products
Sherrill, Inc.
Simonds Industries, Inc.
Southeastern Equipment Company
Tree Tools
Vermeer Manufacturing Company
WesSpur, LLC
Western Tree Equipment & Repairs
Wood/Chuck Chipper Corporation
Woodman Inc.
Zenith Cutter Company

Knives, Chipper Repair
Alexander Equipment Company Inc.
American Arborist Supplies Inc.
Cleaves Company, Inc.
CUES, Inc.
Droge Equipment
ESSCO Distributors, Inc.
Karl Kuemmerling, Inc.
Northeastern Associates
Pacific Arborist Supplies (Canada) Ltd.
Professional Tree Surgeons Supplies Inc.
Redneck Equipment Company Inc.
Shelter Tree, Inc./Tree Care Products
Simonds Industries, Inc.
Southeastern Equipment Company
Tree Tools
Vermeer Manufacturing Company
WesSpur, LLC

Lightning Protection Systems
American Arborist Supplies Inc.
CUES, Inc.
Independent Protection Company
Northeastern Associates
Tree Tools

Lubricants
American Arborist Supplies Inc.
Arbor Direct LLC
Bishop Company
Deer Creek Equipment Inc.
ESSCO Distributors, Inc.
Pacific Arborist Supplies (Canada) Ltd.
STIHL, Inc.
Stuart Brown, Chainsaw Specialist
Tree Tools

Ladders
American Arborist Supplies Inc.
Bishop Company
Cleaves Company, Inc.
Karl Kuemmerling, Inc.
Kramer Equipment Company, Inc.
Niemeyer Corporation
Pacific Arborist Supplies (Canada) Ltd.
Safety Test & Equipment Company
Shelter Tree, Inc./Tree Care Products
Sherrill, Inc.
Tree Tools

Lawn Maintenance
American Chainsaw & 2 Cycle Inc.
Corona Clipper
Crane & Shovel Sales Corporation
Deer Creek Equipment Inc.
DICA Marketing Co.
Excel Industries Inc.
Forestry Suppliers, Inc.
J.P. Fuller Inc.
Niemeyer Corporation
Pacific Arborist Supplies (Canada) Ltd.
Pitt Auto Electric Company
Redneck Equipment Company Inc.
Robin Outdoor Power Equipment/Carswell Distributing Corp.
Shindaiwa, Inc.
STIHL, Inc.
Stuart Brown, Chainsaw Specialist
Tree Tools
WesSpur, LLC

TCI TOOL & SUPPLY DIRECTORY - JULY 2000 - 30
Mulch Coloring Equipment
Alexander Equipment Company Inc.
American Arborist Supplies Inc.
Becker-Underwood Inc.
D跟随 Inc.
Morbark, Inc.

Pneumatic Tools
DendroTech
Karl Kuemmerling, Inc.

Power Pruning Equipment
American Arborist Supplies Inc.
American Standard Company
Bailey's
Ben Meadows Company
Bishop Company
Cleaves Company, Inc.
Deer Creek Equipment Inc.
ECHOf Midwest Equipment & Supply Inc.
ESSCO Distributors, Inc.
Florian Ratchet-Cut
J.P. Fuller Inc.
Husqvarna Forest & Garden Company
Jameson Corporation
Karl Kuemmerling, Inc.
Lanphear Supply
Lawn Equipment Parts Company
NESCO, Inc.
Niemeeyer Corporation
Northeastern Associates
Orchard's Edge
Pacific Arborist Supplies (Canada) Ltd.
Pitt Auto Electric Company
Professional Tree Surgeons Supplies Inc.
Professional Tree & Turf Equipment
Redmax - Komatsu Zenoah America, Inc.
Redneck Equipment Company Inc.
Robinson Reed Power Equipment/ 
Carmel Distributing Corp.
Safety Test & Equipment Company
Shelter Tree, Inc./Tree Care Products
Sherrill, Inc.
STTHL, Inc.
Stuart Brown, Chainsaw Specialist
Tanaka Power Equipment
Tree Tools
Village Blacksmith/ 
Olympia Industrial Inc.
WesSpur, LLC
Western Tree Equipment & Repairs

Pumps
CUES, Inc.
Deer Creek Equipment Inc.

Recycling / Wood Processors
Alexander Equipment Company Inc.
Bandit Industries, Inc.
Becker-Underwood Inc.
Central Boiler
Cleaves Company, Inc.
Deer Creek Equipment Inc.
ESSCO Distributors, Inc.
Florian Ratchet-Cut
J.P. Fuller Inc.
Husqvarna Forest & Garden Company
Jameson Corporation
Karl Kuemmerling, Inc.
Lanphear Supply
Lawn Equipment Parts Company
NESCO, Inc.
Niemeeyer Corporation
Northeastern Associates
Pacific Arborist Supplies (Canada) Ltd.
Tree Tools
Vermeer Manufacturing Company
Western Tree Equipment & Repairs

Root Cutters
Corona Clipper
Crane & Shovel Sales Corporation
Fecon, Inc.

Northeastern Associates
Pacific Arborist Supplies (Canada) Ltd.
Tree Tools
Vermeer Manufacturing Company
Western Tree Equipment & Repairs

Skidsteer Loaders & Implements
The Cat Rental Store
Cleaves Company, Inc.
Deer Creek Equipment Inc.
Gyro-Trac, Inc.
ImpleMax Equipment Co., Inc.
Lund Tech, Inc.
Woodman Inc.

Snow Removal Equipment
American Arborist Supplies Inc.
Cleaves Company, Inc.
Deer Creek Equipment Inc.
Excel Industries Inc.
J.P. Fuller Inc.
Mertz Equipment Sales / 
A Division of Mertz, Inc.
Niemeeyer Corporation
Pacific Arborist Supplies (Canada) Ltd.
Pitt Auto Electric Company
Shindaiwa, Inc.

Sprayers & Accessories
American Arborist Supplies Inc.
Arbor Direct LLC
B & G Equipment Company
Bartlett Manufacturing Company
Deer Creek Equipment Inc.
ESSCO Distributors, Inc.
Forestry Suppliers, Inc.
Forest Lytle & Sons, Inc.
J.P. Fuller Inc.
GNC Industries Inc.
GreenPro Services
Gyro-Trac, Inc.
John Bean Sprayers
Karl Kuemmerling, Inc.
Lanphear Supply
Mertz Equipment Sales / 
A Division of Mertz, Inc.
Minnesota Wanner Company
Northeastern Associates
Pacific Arborist Supplies (Canada) Ltd.
Pitt Auto Electric Company
Professional Tree Surgeons Supplies Inc.
Professional Tree & Turf Equipment
Redneck Equipment Company
Rear's Manufacturing Company

TCI TOOL & SUPPLY DIRECTORY - JULY 2000 - 31
**Stump Cutters**
Abracadabra Landscape Services, Inc.
Alexander Equipment Company Inc.
Arborist Supply Company Inc.
Blade Equipment
J.P. Carlton Company, Div. DAF, Inc.
Cleaves Company, Inc.
Crane & Shovel Sales Corporation
Deer Creek Equipment Inc.
Dostokoi Industries, Inc.
Droge Equipment
Excel Industries Inc.
Fox Manufacturing, Inc.
Husqvarna Forest & Garden Company
Lyons Sawmill & Logging Equipment & Supplies, Inc.
Miller Machine Works
NESCO, Inc.
Northeastern Associates
Powertech Equipment Inc.
Professional Tree Surgeons Supplies Inc.
Rayco Manufacturing, Inc.
Shelter Tree, Inc./Tree Care Products
Sherrill, Inc.
Southeastern Equipment Company
Stump Removal Inc.
Vermeer Manufacturing Company
WesSpur, LLC
Western Tree Equipment & Repairs

**Sweepers**
Cleaves Company, Inc.
Deer Creek Equipment Inc.
Excel Industries Inc.
J.P. Fuller Inc.
Pacific Arborist Supplies (Canada) Ltd.
Pitt Auto Electric Company
Redmax - Komatsu Zenoah America, Inc.
Shindaiwa, Inc.
STIHL, Inc.

**Traffic Safety**
American Arborist Supplies Inc.
Arbor Direct LLC
Bartlett Manufacturing Company
Ben Meadows Company
Bishop Company
Cleaves Company, Inc.
Deer Creek Equipment Inc.
ESSCO Distributors, Inc.
Forestry Suppliers, Inc.
Karl Kuehmerling, Inc.
Kramer Equipment Company, Inc.
Midwest Arborist Supplies
Northeastern Associates
Pacific Arborist Supplies (Canada) Ltd.
Professional Tree Surgeons Supplies Inc.
Redneck Equipment Company Inc.
Safety Test & Equipment Company

**Truck Sales & Accessories**
Alturamats, Inc.
American Truck & Trailer Body Co., Inc.
CUES, Inc.
DICA Marketing Co.
Forestry Equipment of Shelby, Inc.
G & A Equipment Inc.
Hino Diesel Trucks (USA) Inc.
Mayo Global Transportation Inc.
Professional
Services

Used Equipment
Aerial Lift, Inc.
Alexander Equipment Company Inc.
Altec Industries, Inc.
American Arborist Supplies Inc.
Cleaves Company, Inc.
Crane & Shovel Sales Corporation
Cummins Michigan, Inc.
Deer Creek Equipment Inc.
DUECO, Inc.
ESSCO Distributors, Inc.
Forestry Equipment of Shelby, Inc.
G & A Equipment Inc.
Hollie Wood Enterprises
Karl Kuemmerling, Inc.
Lanphear Supply
MTI Insulated Products Inc.
NESCO, Inc.
Opdyke, Inc.
Professional Tree Surgeons Supplies Inc.
Redneck Equipment Company Inc.
Royal Truck & Equipment Inc.
Schodorf Truck Body & Equip. Co.
Shelter Tree, Inc./Tree Care Products
Sherrill, Inc.
Southeastern Equipment Company
Specialized Hydraulics Inc.
Stuart Brown, Chainsaw Specialist
Thayer Chevrolet Toyota
Trueco, Inc.
V & H Inc.
Vermeer Manufacturing Company
WesSpur, LLC
Wood/Chuck Chipper Corporation

Business Opportunities
Christmas Decor & Nite Time Decor

Computer Software / Hardware
ACRT, Inc.
Arbor Computer Systems
Creative Automation Solutions
E.I.D. Inc.
Environmental Consultants, Inc.
Natural Path Forestry Consultants, Inc.
Practical Solutions, Inc.
Service Communication Software
Tree Management Systems Inc.
TreeSage.com

Consulting, Business
Arbor Computer Systems
Arborist Skills, Inc.
Creative Automation Solutions
DendroTech
ELD, Inc.
Eckel & Associates,
  Consultants to the Green Industry
GreenPro Services
National Arborist Association
Triangle Research Inc.

Consulting, Urban Forestry
ACRT, Inc.
E.I.D. Inc.
Natural Path Forestry Consultants, Inc.
Phero Tech Inc.

Education/Workshops/Training/Reference Information
ACRT, Inc.
Arborist Skills, Inc.
Arborist Supply Company Inc.

Financing
Altec Industries, Inc.
The Associates
CAG Corporation
Commerce Leasing, a Leasing Partners Company
First Sierra Financial, Inc.
Greystone Financial Group, Inc.
LINC Capital Inc.
OBL Financial Services Inc.
Oxford Capital
Progress Leasing Company
Tree Tools

GPS Mapping
ACRT, Inc.
Natural Path Forestry Consultants, Inc.
Phero Tech Inc.
Vermeer Manufacturing Company

Wood Furnaces, Outdoor
Central Boiler

Utility Carts
The Cat Rental Store
CUES, Inc.
Deer Creek Equipment Inc.
GNC Industries Inc.
Kramer Equipment Company, Inc.

Professional Services

Payeur Distributions Inc.
Plastic Composites Corporation
Redneck Equipment Company Inc.
Royal Truck & Equipment Inc.
Schodorf Truck Body & Equip. Co.
Southco Industries
Southeastern Equipment Company
SwapLoader, USA Ltd.
Thayer Chevrolet Toyota

Arborist Supply House, Inc.
ArborMaster® Training, Inc.
ArborMaster® Training Canada, Inc.
Beranek Publishing
E.I.D. Inc.
Forest Applications Training, Inc.
IML - Instrument Mechanic Labor, Inc.
Innovated Arborist Supply Inc.
Integrity Tree Care / Training with Integrity
International Society of Arboriculture
Lanphear Supply
Life Support Systems
J.J. Maugt Company
National Path Forestry Consultants, Inc.
National Arborist Association
Rainbow Treecare - Scientific Advancements
Royal Horticultural Society
Sierra Moreno Mercantile Company
Tree Climbers International
Tree Tools
Supplies

Arbor Supplies, General
Abcracadabra Landscape Services, Inc.
Ahlborn Equipment, Inc.
Alexander Equipment Company Inc.
American Arborist Supplies Inc.
American Chainsaw & 2 Cycle Inc.
Arbor Direct LLC
Arborist Supply Company Inc.
Arborist Supply House, Inc.
Arborwear LLC
Bahco Tools Inc.
Bailey’s
Ball Enterprises
Bartlett Manufacturing Company
Bashlin Industries Inc.
Ben Meadows Company
Bishop Company
Blue Ridge Arborist Supply
Buckingham Mfg. Company, Inc.
Cleaves Company, Inc.
Corona Clipper
Cutter’s Choice
Deer Creek Equipment Inc.
Drogey Equipment
ECH0 - Midwest Equipment & Supply Inc.
ESSCO Distributors, Inc.
Fanno Saw Works
Fehr Brothers Industries
Forestry Suppliers, Inc.
Forrest Lytle & Sons, Inc.
Hollie Wood Enterprises
Honey Brothers Limited
Innovated Arborist Supply Inc.
Jameson Corporation
K & R Products
Karl Kuemmerling, Inc.
Kramer Equipment Company, Inc.
Labonville, Inc.
Labonville Supply
Midwest Arborist Supplies
Niagara Safety Products
Niemeyer Corporation
Northeastern Associates
Oregon Cutting Systems Div. Blount Inc.
Pacific Arborist Supplies (Canada) Ltd.
The Peavey Manufacturing Company
Phero Tech Inc.
Pitt Auto Electric Company
Professional Tree Surgeons Supplies Inc.
Professional Tree & Turf Equipment
Redneck Equipment Company Inc.
Safety Test & Equipment Company
Shelter Tree, Inc./Tree Care Products
Sherrill, Inc.
Sierra Moreno Mercantile Company
STIHL, Inc.
Stuart Brown, Chainsaw Specialist

Cabling & Bracing
Alexander Equipment Company Inc.
American Arborist Supplies Inc.
American Chainsaw & 2 Cycle Inc.
Arbor Direct LLC
Bailey’s
Bartlett Manufacturing Company
Bishop Company
Blue Ridge Arborist Supply
Cleaves Company, Inc.
Deer Creek Equipment Inc.
ESSCO Distributors, Inc.
Fehr Brothers Industries
Forrest Lytle & Sons, Inc.
J.P. Fuller Inc.
Innovated Arborist Supply Inc.
Karl Kuemmerling, Inc.
Kramer Equipment Company, Inc.
Labonville, Inc.
Lanphear Supply
Midwest Arborist Supplies
Niemeyer Corporation
Northeastern Associates
Pacific Arborist Supplies (Canada) Ltd.
Preformed Line Products
Professional Tree Surgeons Supplies Inc.
Shelter Tree, Inc./Tree Care Products
Sherrill, Inc.
Stuart Brown, Chainsaw Specialist
Tree Line Supply Company
Tree Tools
Vermeer Manufacturing Company
Wall Safety Products
Western Tree Equipment & Repairs

Climbing Gear
Alexander Equipment Company Inc.
American Arborist Supplies Inc.
American Chainsaw & 2 Cycle Inc.
Arbor Direct LLC
Arborist Supply Company Inc.
Arborist Supply House, Inc.
Bailey's
Bartlett Manufacturing Company
Bashlin Industries Inc.
Ben Meadows Company
Bishop Company
Blue Ridge Arborist Supply
Buckingham Mfg. Company, Inc.
Cleaves Company, Inc.
Climb Axe, Ltd.
Cutter's Choice
Deer Creek Equipment Inc.
Droege Equipment
ESSCO Distributors, Inc.
Excalibur DMM
Forestry Suppliers, Inc.
Forrest Lytle & Sons, Inc.
J.P. Fuller Inc.
Hollie Wood Enterprises
Innovated Arborist Supply Inc.
Karl Kuemmerling, Inc.
Kramer Equipment Company, Inc.
Labonville, Inc.
Lanphear Supply
Main Line Mower
Midwest Arborist Supplies
New England Ropes, Inc.
Niagara Safety Products
Northeastern Associates
Pacific Arborist Supplies (Canada) Ltd.
Petzl America
Pigeon Mountain Industries, Inc.
Professional Tree Surgeons Supplies Inc.
Professional Tree & Turf Equipment
Redneck Equipment Company Inc.
Safety Test & Equipment Company
Shelter Tree, Inc./Tree Care Products
Sherrill, Inc.
Stuart Brown, Chainsaw Specialist
Sylvan Arborists Supplies
Tree Climbers International
Tree Line Supply Company
Tree Tools
V.A. Wolf Inc.
Vermeer Manufacturing Company
Wall Safety Products
Weaver Leather, Inc.
WesSpur, LLC
Western Tree Equipment & Repairs
Yale Cordage, Inc.

Deer Creek Equipment Inc.
DJR Print It! Stitch It!
Forrest Lytle & Sons, Inc.
Karl Kuemmerling, Inc.
Labonville, Inc.
Midwest Arborist Supplies
Pacific Arborist Supplies (Canada) Ltd.
Professional Tree Surgeons Supplies Inc.
Sherrill, Inc.
STIHL Incorporated
Stuart Brown, Chainsaw Specialist
Tree Line Supply Company
Tree Tools
Vermeer Manufacturing Company
WesSpur, LLC
West Coast Shoe Company/WESCO

Footwear
Bailey's
Karl Kuemmerling, Inc.
Labonville, Inc.
STIHL, Inc.
West Coast Shoe Company/WESCO

Diagnostic Tools
American Arborist Supplies Inc.
Bishop Company
Concept Engineering Group, Inc. (CEG)/AIR-SPADE®
DendroTech
Forestry Suppliers, Inc.
IML - Instrument Mechanic Labor, Inc.
Karl Kuemmerling, Inc.
Tree Tools
WesSpur, LLC

Irrigation / Aeration Products
Ben Meadows Company
Deer Creek Equipment Inc.
GNC Industries Inc.
Karl Kuemmerling, Inc.
Tree Feeder Division

Natural Homeopathic Remedies
American Arborist Supplies Inc.
The Doggett Corporation
SelfHEAL, Inc.

Office Supplies
Arbor Computer Systems

Personal Protective Equipment
Abracadabra Landscape Services, Inc.

American Arborist Supplies Inc.
American Chainsaw & 2 Cycle Inc.
Arbor Direct LLC
Arborist Supply Company Inc.
Arborist Supply House, Inc.
Arborwear LLC
Bailey's
Bartlett Manufacturing Company
Bashlin Industries Inc.
Ben Meadows Company
Bishop Company
Buckingham Mfg. Company, Inc.
Cleaves Company, Inc.
Climb Axe, Ltd.
Cutter's Choice
Deer Creek Equipment Inc.

Diagnosis Tools
American Arborist Supplies Inc.
Bishop Company
Concept Engineering Group, Inc. (CEG)/AIR-SPADE®
DendroTech
Forestry Suppliers, Inc.
IML - Instrument Mechanic Labor, Inc.
Karl Kuemmerling, Inc.
Tree Tools
WesSpur, LLC

Irrigation Products
Ben Meadows Company
Deer Creek Equipment Inc.
GNC Industries Inc.
Karl Kuemmerling, Inc.
Tree Feeder Division

Natural Homeopathic Remedies
American Arborist Supplies Inc.
The Doggett Corporation
SelfHEAL, Inc.

Office Supplies
Arbor Computer Systems

Personal Protective Equipment
Abracadabra Landscape Services, Inc.

Poison Ivy Protection
American Arborist Supplies Inc.
Bailey's
Ben Meadows Company
Cleaves Company, Inc.
ESSCO Distributors, Inc.
Midwest Arborist Supplies
Northeastern Associates
Professional Tree Surgeons Supplies Inc.
SelfHEAL, Inc.
Sherrill, Inc.
Tree Line Supply Company
Tree Tools
Western Tree Equipment & Repairs

TCI TOOL & SUPPLY DIRECTORY - JULY 2000 - 35
Pruning Supplies
Alexander Equipment Company Inc.
American Arborist Supplies Inc.
American Chainsaw & 2 Cycle Inc.
American Standard Company
Arbor Direct LLC
Arborist Supply Company Inc.
Arborist Supply House, Inc.
Bahco Tools Inc.
Bailey’s
Bartlett Manufacturing Company
Bashlin Industries Inc.
Bishop Company
Blue Ridge Arborist Supply
Corona Clipper
Cutter’s Choice
Deer Creek Equipment Inc.
Droege Equipment
ESSCO Distributors, Inc.
Fanno Saw Works
Florian Ratchet-Cut
Forrest Lytle & Sons, Inc.
Growtech, Inc.
Hollie Wood Enterprises
Innovated Arborist Supply Inc.
Jameson Corporation
Karl Kuemmerling, Inc.
Kramer Equipment Company, Inc.
Labonville, Inc.
Lanphear Supply
Fred Marvin Associates
Midwest Arborist Supplies
Northeastern Associates
Orchard’s Edge
Oregon Cutting Systems Div. Blount Inc.
The Peavey Manufacturing Company
Pitt Auto Electric Company
Professional Tree Surgeons Supplies Inc.
Safety Test & Equipment Company
Shelter Tree, Inc./Tree Care Products
Sherrill, Inc.
Stuart Brown, Chainsaw Specialist
Sylvan Arborists Supplies
Takagi Tools, Inc.
Tree Line Supply Company
Tree Tools
Village Blacksmith/
Olympia Industrial Inc.
WesSpur, LLC
Western Tree Equipment & Repairs

Tree Tools
Western Tree Equipment & Repairs

Rope
Alexander Equipment Company Inc.
American Arborist Supplies Inc.
American Chainsaw & 2 Cycle Inc.
The American Group - Samson Div.
Arbor Direct LLC
Arborist Supply Company Inc.
Arborist Supply House, Inc.
Bailey’s
Bartlett Manufacturing Company
Bashlin Industries Inc.
Ben Meadows Company
Bishop Company
Blue Ridge Arborist Supply
Buccaneer Rope Company
Cleaves Company, Inc.
Climb Axe, Ltd.
Columbian Rope Company
Cutter’s Choice
Deer Creek Equipment Inc.
Droege Equipment
ESSCO Distributors, Inc.
Forrest Lytle & Sons, Inc.
J.P. Fuller Inc.
Hollie Wood Enterprises
Innovated Arborist Supply Inc.
Karl Kuemmerling, Inc.
Kramer Equipment Company, Inc.
Labonville, Inc.
Lanphear Supply
Main Line Mower
Midwest Arborist Supplies
New England Ropes, Inc.
Niemeyer Corporation
Northeastern Associates
Pacific Arborist Supplies (Canada) Ltd.
Petzl America
Pigeon Mountain Industries, Inc.
Professional Tree Surgeons Supplies Inc.
Professional Tree & Turf Equipment
Redneck Equipment Company Inc.
Safety Test & Equipment Company
Shelter Tree, Inc./Tree Care Products
Sherrill, Inc.
Stuart Brown, Chainsaw Specialist
Sylvan Arborists Supplies
Sunbelt Outdoor Products Inc.
Tree Line Supply Company
Tree Tools
TreeTech Microinjection Systems

Stuart Brown, Chainsaw Specialist
Sunbelt Outdoor Products Inc.
Sylvan Arborists Supplies
Tree Line Supply Company
Tree Tools
Vermicel Manufacturing Company
Wall Safety Products
WesSpur, LLC
Western Tree Equipment & Repairs
Yale Cordage, Inc.

Soil Amendments
American Arborist Supplies Inc.
AMVAC Chemical

Tree Injections / Implants
American Arborist Supplies Inc.
American Chainsaw & 2 Cycle Inc.
Arbor Systems, LLC
Ben Meadows Company
Cleaves Company, Inc.
Creative Sales, Inc. (CSI)
The Doggett Corporation
Droege Equipment
ESSCO Distributors, Inc.
Forrest Lytle & Sons, Inc.
GreenPro Services
Grow Gun Corporation
Lanphear Supply
J.J. Mauget Company
Midwest Arborist Supplies
Professional Tree Surgeons Supplies Inc.
Rainbow Treecare -
Scientific Advancements
Remke Enterprises, Inc.
Shelter Tree, Inc./Tree Care Products
Sherrill, Inc.
Tree Feeder Division
Tree Line Supply Company
Tree Tech Microinjection Systems

Tree Protectors
American Arborist Supplies Inc.
American Chainsaw & 2 Cycle Inc.
Ben Meadows Company
Cleaves Company, Inc.
Deep Root Partners, L.P.
Deer Creek Equipment Inc.
Midwest Arborist Supplies
Pacific Arborist Supplies (Canada) Ltd.
Sherrill, Inc.
Tree Tools
Western Tree Equipment & Repairs

Macro Infusion Supplies
Rainbow Treecare -
Scientific Advancements
Chemicals

Adjuvants / Misc. Chemicals
Ben Meadows Company
ESSCO Distributors, Inc.
Forrest Lytle & Sons, Inc.
Midwest Arborist Supplies
Monterey Lawn & Garden Products, Inc.
NU-ARBOR Tree & Shrub Care Products
Plant Health Care Inc.
Professional Tree Surgeons Supplies Inc.
Remke Enterprises, Inc.
Roots Inc.
Shelter Tree, Inc./Tree Care Products

Bioinsecticides
Forrest Lytle & Sons, Inc.
Midwest Arborist Supplies
Plant Health Care Inc.
Professional Tree Surgeons Supplies Inc.

Biopesticides
American Cyanamid Company
ESSCO Distributors, Inc.
Forrest Lytle & Sons, Inc.
GreenPro Services
Plant Health Care Inc.
Professional Tree Surgeons Supplies Inc.

Chemical Absorbants
ESSCO Distributors, Inc.
Forrest Lytle & Sons, Inc.
Professional Tree Surgeons Supplies Inc.
Remke Enterprises, Inc.

Fertilization Supplies
American Arborist Supplies Inc.
B & G Equipment Company
Becker-Underwood Inc.
Ben Meadows Company
Cleaves Company, Inc.
Creative Sales, Inc. (CSI)
Deer Creek Equipment Inc.
The Doggett Corporation
ESSCO Distributors, Inc.
Forrest Lytle & Sons, Inc.
GreenPro Services
Grow Gun Corporation
Growth Products, Ltd.
Lanphear Supply
J.J. Mauget Company
Midwest Arborist Supplies
Monterey Lawn & Garden Products, Inc.
Northeast Shade Tree
Northeastern Associates
NU-ARBOR Tree & Shrub Care Products
Plant Health Care Inc.
Professional Tree Surgeons Supplies Inc.
Remke Enterprises, Inc.
Roots Inc.
Shelter Tree, Inc./Tree Care Products
Tree Line Supply Company
Tree Tech Microinjection Systems
Willman's Earth Restoration Co.

Fungicides
ArborSystems, LLC
Bayer Corporation, Ag. Division
Cleary Chemical
ESSCO Distributors, Inc.
FMC Corporation - APG Specialty Products
Forrest Lytle & Sons, Inc.
Gowan Company
Growth Products, Ltd.
J.J. Mauget Company
Monterey Lawn & Garden Products, Inc.
Professional Tree Surgeons Supplies Inc.
Rainbow Treecare - Scientific Advancements
Tree Tech Microinjection Systems

Growth Retardants / Regulators
ACRT, Inc.
AMVAC Chemical
Dow AgroSciences
Forrest Lytle & Sons, Inc.
Gowan Company

Herbicides
American Cyanamid Company
Bayer Corporation, Ag. Division
Reemay Inc./Bio Barrier
Ben Meadows Company
Dow AgroSciences
ESSCO Distributors, Inc.

Insecticides
AMVAC Chemical
ArborSystems, LLC
Avenris CropScience
Bayer Corporation, Ag. Division
Cleary Chemical
Creative Sales, Inc. (CSI)
Dow AgroSciences
ESSCO Distributors, Inc.
FMC Corporation - APG Specialty Products
FMC Corporation - Specialty Products Business
Forrest Lytle & Sons, Inc.
Gowan Company
J.J. Mauget Company
Midwest Arborist Supplies
Monterey Lawn & Garden Products, Inc.
Professional Tree Surgeons Supplies Inc.
Tree Tech Microinjection Systems

Integrated Pest Management
American Cyanamid Company
Phero Tech Inc.
Plant Health Care Inc.
Professional Tree Surgeons Supplies Inc.
Rainbow Treecare - Scientific Advancements
Tree Line Supply Company

Miticides
ESSCO Distributors, Inc.
Forrest Lytle & Sons, Inc.
Gowan Company
Professional Tree Surgeons Supplies Inc.
Tree Tech Microinjection Systems

Repellents
Ben Meadows Company
ESSCO Distributors, Inc.
Forrest Lytle & Sons, Inc.
Phero Tech Inc.
**LISTING**

<table>
<thead>
<tr>
<th>(M) Aerial Lift, Inc.</th>
<th>(S) Service Provider</th>
</tr>
</thead>
<tbody>
<tr>
<td>PO Box 66571</td>
<td></td>
</tr>
<tr>
<td>Plains Road</td>
<td>Alexander Equipment Company Inc.</td>
</tr>
<tr>
<td>Milford, CT</td>
<td>4728 Yender Avenue</td>
</tr>
<tr>
<td>06460-0066</td>
<td>Lisle, IL 60532</td>
</tr>
<tr>
<td>Toll-Free: USA 800-446-5438</td>
<td>Phone: 630-663-1400</td>
</tr>
<tr>
<td>Toll-Free: CT 800-245-5438</td>
<td>Fax: 630-663-9754</td>
</tr>
<tr>
<td>Phone: 203-878-0694</td>
<td>E-mail: <a href="mailto:alexandrtequip@msn.com">alexandrtequip@msn.com</a></td>
</tr>
<tr>
<td>Fax: 203-878-2549</td>
<td>Web: <a href="http://www.alexequip.com">www.alexequip.com</a></td>
</tr>
<tr>
<td>E-mail: <a href="mailto:aerialinfo@aol.com">aerialinfo@aol.com</a></td>
<td>Contact: Steve Johnston</td>
</tr>
<tr>
<td>Web: <a href="http://www.aeriallift.com">www.aeriallift.com</a></td>
<td></td>
</tr>
<tr>
<td>Contacts: Ernie E. DePiero, Richard Mitchell</td>
<td></td>
</tr>
<tr>
<td>Manufacturer of aerial lifts, hydraulic dump chip boxes and accessories.</td>
<td></td>
</tr>
</tbody>
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<table>
<thead>
<tr>
<th>(M) Agape Designs</th>
<th>See Our Ad in 4-Color Product Directory</th>
</tr>
</thead>
<tbody>
<tr>
<td>2660 West Baseline Road</td>
<td></td>
</tr>
<tr>
<td>Mesa, AZ 85202</td>
<td></td>
</tr>
<tr>
<td>Toll-Free: 800-990-TREE (8733)</td>
<td></td>
</tr>
<tr>
<td>Phone: 480-820-3939</td>
<td></td>
</tr>
<tr>
<td>Fax: 480-820-3940</td>
<td></td>
</tr>
<tr>
<td>E-mail: <a href="mailto:Agapetrees@msn.com">Agapetrees@msn.com</a></td>
<td></td>
</tr>
<tr>
<td>Web: <a href="http://www.agapetree-tees.com">www.agapetree-tees.com</a></td>
<td></td>
</tr>
<tr>
<td>Contact: Doreen Orist</td>
<td></td>
</tr>
</tbody>
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<table>
<thead>
<tr>
<th>(D) Ahlborn Equipment, Inc.</th>
<th>See Our Ad in 4-Color Product Directory</th>
</tr>
</thead>
<tbody>
<tr>
<td>PO Box 500</td>
<td></td>
</tr>
<tr>
<td>238 Main Street, Highway 155</td>
<td></td>
</tr>
<tr>
<td>Sayner, WI 54560-0500</td>
<td></td>
</tr>
<tr>
<td>Toll-Free: 800-472-7600</td>
<td></td>
</tr>
<tr>
<td>Phone: 715-542-3271</td>
<td></td>
</tr>
<tr>
<td>Fax: 800-542-3581</td>
<td></td>
</tr>
<tr>
<td>E-mail: <a href="mailto:ahlborn@nnex.net">ahlborn@nnex.net</a></td>
<td></td>
</tr>
<tr>
<td>Contact: Evelyn J. and Gene Ahlborn</td>
<td></td>
</tr>
</tbody>
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<thead>
<tr>
<th>(S) Albiez Insurance Agency, Inc.</th>
<th>See Our Ad in 4-Color Product Directory</th>
</tr>
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<tbody>
<tr>
<td>PO Box 39</td>
<td></td>
</tr>
<tr>
<td>Woodbridge, NJ 07095</td>
<td></td>
</tr>
<tr>
<td>Toll-Free: 800-272-6771</td>
<td></td>
</tr>
<tr>
<td>Phone: 800-272-6771</td>
<td></td>
</tr>
<tr>
<td>Fax: 732-634-1301</td>
<td></td>
</tr>
<tr>
<td>E-mail: <a href="mailto:Devin@aianj.com">Devin@aianj.com</a></td>
<td></td>
</tr>
<tr>
<td>Contact: Devin Blazier</td>
<td></td>
</tr>
</tbody>
</table>

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<tr>
<th>(M) Alteck Industries, Inc.</th>
<th>See Our Ad in 4-Color Product Directory</th>
</tr>
</thead>
<tbody>
<tr>
<td>Inverness Center Parkway, Suite 13031</td>
<td></td>
</tr>
<tr>
<td>Birmingham, AL 35242</td>
<td></td>
</tr>
<tr>
<td>Toll-Free: 800-958-2555</td>
<td></td>
</tr>
<tr>
<td>Phone: 205-991-7733</td>
<td></td>
</tr>
<tr>
<td>Fax: 205-991-7747</td>
<td></td>
</tr>
<tr>
<td>E-mail: <a href="mailto:headquarters@altec.com">headquarters@altec.com</a></td>
<td></td>
</tr>
<tr>
<td>Web: <a href="http://www.altecc.com">www.altecc.com</a></td>
<td></td>
</tr>
</tbody>
</table>

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<thead>
<tr>
<th>(M) Altarnamats, Inc.</th>
<th>See Our Ad in 4-Color Product Directory</th>
</tr>
</thead>
<tbody>
<tr>
<td>RR5, Box 567, Keely Road</td>
<td></td>
</tr>
<tr>
<td>Franklin, PA 16323</td>
<td></td>
</tr>
<tr>
<td>Phone: 888-544-6287</td>
<td></td>
</tr>
<tr>
<td>Fax: 814-827-2903</td>
<td></td>
</tr>
<tr>
<td>E-mail: <a href="mailto:altarnamats@mail.usachoice.net">altarnamats@mail.usachoice.net</a></td>
<td></td>
</tr>
<tr>
<td>E-mail: <a href="mailto:geharry@mail.usachoice.net">geharry@mail.usachoice.net</a></td>
<td></td>
</tr>
<tr>
<td>Web: <a href="http://www.altarnamats.com">www.altarnamats.com</a></td>
<td></td>
</tr>
<tr>
<td>Contact: Gerald Harry</td>
<td></td>
</tr>
</tbody>
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Fax: 909-392-2036
Corporate Headquarters
Mobile Tool International Inc.
5600 West 8th Avenue
Denver, CO 80203-9986
Toll-Free: 800-521-5351
Fax: 303-657-2505
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(S) Amerisafe, Inc.
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Tualatin, OR 97062
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Phone: 503-692-5494
Fax: 503-692-0587
E-mail: jmbbrunner@aol.com
Contact: Joe Brunner

(S) Arbor Computer Systems
117 Weston Road
Westport, CT 06880
Phone: 203-226-4335
Fax: 203-454-3019
E-mail: arbore@cs.com
Contact: Peter Hannan

(D/M) Arbor Direct LLC
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Newfane, NY 14108
Toll-Free: 877-796-5999
Phone: 716-778-7021
Fax: 716-778-5568
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Contact: David Hineline

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Canada T3E 5B4
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Web: www.arboristsupplyco.com
Contact: Robert Romeril

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Contact: Ken Palmer
ArborMaster Training Canada, Inc.
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Olds, Alberta, Canada T4H 1P2
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Toll-Free: 800-698-4641
Phone: 402-339-4459
Fax: 402-339-5011
E-mail: chip@arborsystemsllc.com
Web: www.arborsystemsllc.com
Contact: Chip Doolittle

(M) Arbortech
3203 West Old Lincoln Way
Wooster, OH 44691
Toll-Free: 800-255-5715
Phone: 330-264-4266
Fax: 330-264-0891
E-mail: custservice@arbortech.cc
Contact: Keith Barr

(M) Arborwear LLC
PO Box 341
Chagrin Falls, OH 44022
Toll-Free: 888-578-8733
Phone: 440-247-6967
Fax: 440-247-0178
E-mail: info@arborwear
Web: www.arborwear.com
Contact: Paul Taylor

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(S) Armstrong Hydraulic Repairs Inc.
104 West Park Avenue
Sellersville, PA 18960
Toll-Free: 800-711-2806
Phone: 215-257-4800
Fax: 215-257-2954
E-mail: cgehman@voicenet.com
Web: www.armstronghyd.com
Contact: Joe Armstrong

(S) The Associates—Medium Duty Truck Div.
293 Lincoln Avenue
Secaucus, NJ 07094
Toll-Free: 800-848-4098
Phone: 201-863-8297
Fax: 201-863-5250
Web: www.thearcassociates.com

(D/M) Baker Equipment Engineering Company
PO Box 25609
Richmond, VA 23260-5609
Toll-Free: 800-765-2257
Phone: 804-358-0481
Fax: 804-342-6888
E-mail: allen@bakerequipment.com
Web: bakerequipment.com
Contact: Allen Raines

(M) Ball Enterprises
Unit K, 330 E Orangethorpe
Placentia, CA 92870
Phone: 714-528-8010
Fax: 714-961-0707
Contact: Frank Monnig

(M/D) Bandit Industries, Inc.
6750 Millbrook Road
Remus, MI 49340
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Detroit, MI 48202
Toll-Free: 800-331-7101
Phone: 313-873-7300
Fax: 313-873-5454
Contact: John Nelson

(M) Bashlin Industries Inc.
PO Box 867
119 West Pine Street
Grove City, PA 16127
Phone: 724-458-8340
Fax: 724-458-8342
E-mail: sales@bashlin.com
Web: www.bashlin.com
Contact: Rod Paul

(M) Bayer Corporation, Ag. Division
6700 Corporate Drive, Suite 230
Kansas City, MO 64120
Toll-Free: 800-842-8020
Phone: 816-242-4749
Fax: 816-241-4735
Contact: Neil Cleveland
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(M) Becker-Underwood Inc.
PO Box 667
Ames, IA 50010
Toll-Free: 800-232-5907
Phone: 515-232-5907
Fax: 515-232-5961
E-mail: msherman@bischco.com
Web: www.bischco.com
Contact: Mike Sherman

(D) Ben Meadows Company
190 Etoeh Industrial Court
Canton, GA 30114
Toll-Free: 800-241-6401
Phone: 770-479-3130
Fax #1: 770-479-3133
Fax #2: 800-628-2068
E-mail: djohnson@benmeadows.com
Web: www.benmeadows.com
Contact: Doug Johnson
Distributor of tree climbing, tree pruning, root feeding, soil testing, tree borers and general tree care equipment, etc.

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(S) Beranek Publishing
PO Box 251
Ft. Bragg, CA 97437
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5362 McGinnis Ferry Road
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Phone: 678-624-0877
Fax: 678-624-0878
Web: bidmanager.com
Contact: Quinn Martin

(D) Bishop Company
PO Box 870
12519 East Putnam Street
Whittier, CA 90602
Toll-Free: 800-421-4833 [Se habla Espanol]
Fax: 562-698-2238
E-mail: sales@bischco.com
Web: www.bischco.com
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Toll-Free: 919-359-3374
Phone: 919-359-3379
E-mail: dantz@auol.com
Web: www.bladeequipment.com
Contact: Dan Deriscavage

(D) Blue Ridge Arborist Supply
PO Box 1626
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Fax: 540-825-6451
Web: www.blueridge.baweb.com
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Fax: 810-758-7829
Contact: John Parenteau
Buy direct from the original manufacturer.

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(D/M) John Brown & Sons, Inc.
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Sawyer Industrial Park
Weare, NH 03281
Toll-Free: 603-529-7976
Fax: 603-529-7974
E-mail: bronto@gsinet.net
Web: www.brownbronto.com
Contact: Harvey Donaldson
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(M) Brown Manufacturing Corporation
Box 339, Route 3
Ozark, AL 35660-0339
Toll-Free: 256-587-6232
Fax: 256-587-9223
E-mail: brcrope@Hiwaay.net
Phone: 607-773-2425
Fax: 607-773-2068
Web: www.bucolor.com
E-mail: msherman@bucolor.com
Contact: Mike Sherman

(M) Buckingham Mfg. Company, Inc.
PO Box 16901-11
Travis Avenue
Binghamton, NY 13902
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Fax: 607-773-2425
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Contacts: Jim Pennefather, Chris dela Vera
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Fax: 610-558-1949
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Web: www.cagcorp.com
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U.K. BR1 3RA
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Fax: +44 (0) 181 315 5000
E-mail: camberford@aol.com
Contact: Dominique Kelly

(M) J.P. Carlton Company, Div. DAF, Inc.
121 John Dodd Road
Spartanburg, SC 29303
Toll-Free: 864-578-9335
Phone: 864-578-3928
Fax: 864-578-6232
Web: www.stumpcutters.com
Contact: Travis Avenue
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22319 Alabama Highway 79
Scottsboro, AL 35768
Toll-Free: 800-358-ROPE (7673)
Phone: 256-587-6232
Fax: 256-587-9223
E-mail: bucrope@Hiwaay.net
Contact: Dan Fockman
(D/M) The Cat Rental Store
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Novi, MI 48375
Toll-Free: 888-642-4228
Phone: 248-349-4800
Fax: 248-380-5474
E-mail: tevedarmofal@michigancat.com
Web: michigancat.com
Contact: Bill Parker

(M) CEI
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Fax: 612-425-5196
Contact: Sandra Stroud

(S) Christmas Decor & Nite Time Decor
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Fax: 806-722-9627
E-mail: blake@christmasdecor.net
Contact: Blake Smith

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Fax: 781-444-5611
Contact: Lenny Cleaves

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Portland, OR 97242-0314
Phone: 503-236-9552
Fax: 503-236-9553
E-mail: climbaxe@aracnet.com
Web: www.climbaxe.com
Contact: Joe Garland
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(S) CNA Commercial Insurance
Chicago, IL 60685
800-CNA-6241 [262-6241]
Web: www.cna.com/commercial
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(M) Columbian Rope Company
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Guntown, MS 38849
Toll-Free: 800-821-4391
Phone: 662-348-2241
Fax: 662-348-5749
E-mail: richard@columbianrope.com
Web: www.columbianrope.com
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Fax: 856-273-9717
E-mail: cfcsales@interstat.net
Contact: Rachael Theibault

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Fax: 412-826-8601
E-mail: ceg@air-spade.com
Web: www.air-spade.com
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(M/S) Corona Clipper
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Corona, CA 92879
Toll-Free: 800-847-7863
Phone: 909-737-6515
Fax: 909-737-8657
E-mail #1: sales@coronaclipper.com
E-mail #2: jreisbek@coronaclipper.com
Web: www.coronaclipper.com
Contact: John Reisbeck
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(D) Crane & Shovel Sales Corporation
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Fax: 440-439-2177
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Fax: 410-465-3593
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Fax: 402-727-4841
Web: www.acecap-medicap.com
Contacts: Warren D. Wolfe, Bryan K. Wolf
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Fax: 603-886-5909
E-mail: info@cuesnet.com
Web: www.cues.net/aboutus.html
Contact: Bruce Bostock
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Fax: 814-898-0275
Web: www.cutterschoice.com
Contact: Andy Bethel

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San Francisco, CA 94103
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Phone: 415-437-9700
Fax: 415-437-9744
E-mail: deeproot@earthlink.net
Web: www.deeproot.com
Contact: Graham Ray

Deer Creek Equipment Inc.
721 Wheler School Road
Whiteford, MD 21160
Toll-Free: 800-551-6567
Phone: 410-452-5252
Fax: 410-452-5373 or 5393
E-mail: gregg@dcequip.com
Web: www.dcequip.com
Contact: Bryan Marcinko

DendroTech
PO Box 766
Calistoga, CA 94515
Phone: 707-942-9139
Fax: 707-942-2150
E-mail: grossfam@pacbell.net
Contact: Rob Gross

Dennis Tool Company
2020 Rankin Road
Houston, TX 77073-5100
Phone: 281-821-9495
Fax: 281-821-4171
E-mail: bobwullschleger@aol.com
Web: denstool@flash.net
Contact: Bob Wullschleger

Deutz Corporation
3883 Steve Reynolds Boulevard
Norcross, GA 30093
Phone: 770-564-7100
Fax: 770-564-7222
E-mail: mendoza.g@deutz.de
Web: www.deutz.de
Contact: Gustavo Mendoza

DICA Marketing Co.
249 Windwood Drive
Carroll, IA 51401
Toll-Free: 800-610-DICA (3422)
Phone: 712-792-5200
Fax: 712-792-1106
E-mail: info@dicaUSA.com
Web: www.dicaUSA.com
Contact: Dick Koberg

Ditch Witch of the Carolinas
4600 N I-85 Service Road
Charlotte, NC 28206-1357
Phone: 704-596-5700
Fax: 704-596-6681
E-mail: sales@dwoct.com
Contacts: Steve Neal, Steve Ford
Specializing in Stanley Hydraulic tools, parts and service; Ditch Witch trenchers and directional boring machines.

DJR Print It! Stitch It!
1012 First Street
Radford, VA 24141
Toll-Free: 800-847-3357
Phone: 540-951-0320
Fax: 540-941-0008
E-mail: hatman@naxs.com
Contact: David McDaniel

DUECO, Inc.
N4 W22610 Bluemound Road
Box 53187
Waukesha, WI 53186
Toll-Free: 800-558-4004
Phone: 414-547-8407
Fax: 414-547-8094
E-mail: info@dueco.com
Web: www.dueco.com
Contact: David Roembke

ECHO - Midwest Equipment & Supply Inc.
901 Keck Avenue
Evansville, IN 47710
Toll-Free: 800-234-5693
Phone: 812-425-6216
Fax: 812-425-6294
Contact: Scott Hammond

S Eckel & Associates,
Consultants to the Green Industry
PO Box 225
Street Michael, MD 21663
Phone: 410-745-1141
E-mail: hleckel@expresshost.com
Supplying skills for developing training programs and creating organizational structures and management systems to accommodate growth and expansion. Assistance in tracking branch operations, multiple service costs, and operating profits. Plus company sale and acquisition appraisals.

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(M) Excel Industries Inc.
PO Box 7000
200 South Ridge Road
Hesston, KS 67062-2097
Toll-Free: 800-395-4757
Phone: 316-327-4911
Fax: 316-327-3123
E-mail: kraney@excelhustler.com
Web: www.excelhustler.com
Contact: Ken Raney
Excel Hustler manufactures a complete line of commercial rotary mowing equipment. Cutting widths range from 37 inches to over 12 feet. All models, whether walk-behind or rider, whether rear steer or zero turn, feature unsurpassed durability, productivity, and ease of operation. Multi-season attachments keep them productive all year long.
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(M) Fanno Saw Works
PO Box 628224
West 8th Avenue
Chico, CA 95927-0628
Phone: 530-895-1762
Fax: 530-895-0302
E-mail: info@fannosaw.com
Web: www.fannosaw.com
Contact: Robert A. Fanno
Manufacturer of folding saws, curved-blade tree saws, pole saws & special purpose saws. Also, supplier of pole pruners with wood or fiberglass poles. Fanno International, supplier of Tri-Edge pruning saws with durability in mind.
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(M) Fecon, Inc.
10350 Evendale Drive
Cincinnati OH 45241
Toll-Free: 800-528-3113
Phone: 513-956-5700
Fax: 513-956-5701
E-mail: Fecon@Fuse.net
Web: www.Fecon.com
Contact: John Heekin

(S) First Sierra Financial, Inc.
Powered by SierraCities.com
Nationwide Arbor Industry Specialists
1. Eileen Gresens
3901 Roswell Road, NE, Ste. 200
Marietta, GA 30062
Toll-Free: 800-443-8301 x 223
Toll-Free Fax: 800-343-0392
E-mail: eileengresens@firstsierra.com
Web: www.firstsierra.com
The experts in Green Industry financing nationwide! Specializes in leasing/financing of new and used equipment to help your business grow. Up to $75,000 without financial statements. Call for your quick and easy pre-approval, or apply online!
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(M) Florian Ratchet-Cut
PO Box 325
Plantsville, CT 06479
Toll-Free: 800-275-3618
Phone: 860-628-9643
Fax: 860-628-6036
E-mail: sales@florianrachetcut.com
Web: www.florianrachetcut.com
Contact: Nathaniel Florian
FMC Corporation - Specialty Products Business
1735 Market Street
Philadelphia, PA 19103
Toll-Free: 800-321-1FMC
Phone: 215-229-6014
Fax: 215-299-6100
Contact: Nancy Schwartz, Communication Manager
FMC manufactures Astro and Talstar insecticides for use on trees, ornamentals and lawns. Call your chemical supplier for details or call 1-800-321-1FMC for our nearest FMC sales representative.

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M) FMC Corporation - Specialty Products Business
1175 Hoosick Road #4
Troy, NY 12180
Phone: 518-279-2855
Fax: 518-279-2857
Contact: Arden Bull
Astro-Insecticide and Talstar Flowable Insecticide-Miticide. Both are safe on foliage, have virtually no odor, and come with "Caution" labels.

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(D) J.P. Fuller Inc.
1812 Crain Highway
Glen Burnie, MD 21061
Toll-Free: 800-932-5095
Phone: 410-766-5120
Fax: 410-761-5119
Contact: Marc Lombardi

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(D) G & A Equipment Inc.
13701 Hickory Creek Road
Lenoir City, TN 37772
Toll-Free: 800-856-8261
Phone: 865-985-7595
Fax: 865-986-0450
E-mail: gandaequip@nxs.net
Web: GANDAEQUIPMENT.COM
Contact: Garrell E. Foshee

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(D/M) GNC Industries Inc.
1808 Airport Road
Pocahontas, AR 72455
Toll-Free: 800-462-2005
Phone: 870-248-9901
Fax: 870-248-9905
E-mail: jjjaeger@gnc-industries.com
Web: www.gnc@industries.com
Contact: James R. Jaeger

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(D/M) Gowen Company
PO Box 5569
Yuma, AZ 85366-5569
Phone: 520-783-8844
Fax: 520-343-9255
E-mail: jkellander@gowanco.com
Web: www.gowanco.com
Contact: Jeff Kjellander

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(M) Gravely Division of Ariens
655 West Ryan Street
Brillion, WI 54110-0157
Toll-Free: 800-472-8359
Phone: 920-756-2141
Fax: 920-756-2407
E-mail: kwiseman@ariens.com
Web: www.gravely.com
Contact: Kevin Wiseman

(M) Green Manufacturing Inc.
PO Box 640
New Boston, MI 48164
Toll-Free: 888-1GREEN (47336)
Phone: 734-753-5200 or 4200
Fax: 734-753-5226
E-mail: green@greenmfg.com
Web: www.greenmanufacturing.com
Contact: Kevin J. Green

(D/M) GreenPro Services
380 South Franklin Street
Hempstead, NY 11550
Toll-Free: 800-645-6464
Toll-Free: 800-585-7959 (WEST)
Phone: 516-538-6464
Fax: 516-538-2042
Contact: Robert R. Riley

(M) Green-Releaf by Sybron
111 Kesler Mill Road
Salem, VA 24153
Toll-Free: 800-788-9986
Phone: 540-389-9361
Fax: 540-389-2688
E-mail: jsceovy@sybronchemicals.com
Web: www.green-releaf.com
Contact: John Seoivy

(S) Greystone Financial Group, Inc.
PO Box 1447
West Chester, PA 19380
Toll-Free: 888-718-1500
Phone: 610-738-7100
Fax: 610-738-0871
E-mail: Gstonefin@aol.com
Contact: Bruce E. Krah

(M) Grow Gun Corporation
5322 Howell Street
Arvada, CO 80002
Phone: 303-278-9112
Fax: 303-279-5101
E-mail: growgun@denver.infi.net
Web: www.denver.infi.net\-growgun

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(D) Mertz Equipment Sales / A Div. of Mertz, Inc.
PO Box 150
2320 West South Avenue
Ponca City, OK 74001-0150
Toll-Free: 800-654-4333
Phone: 580-763-0085
Fax: 580-763-0082
E-mail: rvanater@mertzok.com
Web: www.mertzok.com
Contact: Rick Vanater

(S) Middle Tennessee Auction Co., Inc.
926 Lawnview Lane
Franklin, TN 37064
Phone: 615-568-4933
Fax: 615-568-7780
E-mail: grdarbor@treecaresupplies.com
Web: www.treecaresupplies.com
Contact: Brad Collie
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(D) Midwest Arborist Supplies
PO Box 151455
Grand Rapids, MI 49515-1455
Grand Toll-Free: 800-423-3789
Phone: 616-456-8040
Fax: 616-456-7780
E-mail: morbark@worldnet.att.net
Web: www.morbark.com
Contact: W.T. "Tom" Thomson
See Our Ad in 4-Color Product Directory

(M) Morbark, Inc.
PO Box 1000
8507 South Winn Road
Winn, MI 48896-1000
Toll-Free: 800-362-9010
Phone: 517-866-2381
Fax: 517-866-2280
E-mail: morbark@worldnet.att.net
Web: www.morbark.com
Contact: Mark Rau
Morbark manufactures nine models of high-quality, technically advanced, handfed brush chippers to fit every arborist's needs. For over 40 years, Morbark has been a leader in wood waste processing, recycling and forestry equipment and provides you with an extensive background in quality manufactured equipment.
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(M) Mountain Valley Manufacturing, Inc.
RT 2, Box 963
New Castle, VA 24127
Toll-Free: 800-697-5033
Phone: 540-864-7104
Fax: 540-864-7104
E-mail: bonnieb@aianj.com
Web: www.treecaresupplies.com
Contact: Tom Wanne
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(D/M) Minnesota Wanner Company
5145 Eden Avenue South
Minneapolis, MN 55436
Toll-Free: 800-247-4998
Phone: 540-864-1079
Fax: 540-864-5933
E-mail: mnwanner@visi.com
Contact: Tom Wanne
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(D/M) MIRK Inc./Toombs Truck & Equipment
7629 Chippewa Road
Orville, OH 44667
Phone: 330-669-2000
Fax: 330-669-3732
Contact: Richard Toombs
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(D) Mobile Tool International Inc./Holan
5600 W 88th Avenue
Denver, CO 80030-9986
Toll-Free: 800-521-5351
Phone: 303-657-2590
Fax: 303-657-2505
Web: www.mobitool.com
Contact: Al Rocke

(M) Monterey Lawn & Garden Products, Inc.
PO Box 35000
3654 South Willow Avenue
Fresno, CA 93745-5000
Phone: 559-499-2100
Fax: 559-499-1015
Web: www.montereylawngarden.com
Contact: W.T. "Tom" Thomson
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(S) National Arborist Association
3 Perimeter Road, Unit 1
Manchester, NH 03103
Toll-Free: 800-733-2622
Phone: 603-314-5380
Fax: 603-314-5386
E-mail: naa@natarb.com
Web: www.natarb.com

(D) National Insurance Programs
900 Route 9 North, Ste. 503
Woodbridge, NJ 07095
Toll-Free: 800-446-7647
Fax: 732-634-2904
E-mail: Bonnie@aianj.com
Contact: Bonnie Bernstein

(S) Natural Path Forestry Consultants, Inc.
PO Box 7723
Missoula, MT 59807-7723
Phone: 406-721-3263
Fax: 406-544-2295
E-mail: natpath@naturalpath.com
Web: www.naturalpath.com
Contact: Mark Duntemann

(D) NESCO, Inc.
3112 East State Road 124
Bluffton, IN 46714
Toll-Free: 800-252-0043
Phone: 219-824-6340
Fax: 219-824-6350
E-mail: nesco@nescosales.com
Web: www.nescoesales.com
Contact: Jason Troxel
Bucket trucks, tonnage cranes, chipper trucks, chippers, stump grinders and much more! Rentals/leasing with options to purchase.
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(M) New England Ropes, Inc.
848 Airport Road
Fall River, MA 02720-4735
Toll-Free: 800-333-6679
Phone: 508-678-8200
Fax: 508-679-2363
E-mail: neropes@neropes.com
Web: www.neropes.com
Contact: Stephen Parola
Rope manufacturer—spliced goods, braided three-stranded climbing and bull ropes for the professional arborist.
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(D) Niagara Safety Products
PO Box 25
580 Industrial Drive
Fort Erie, Ontario
Canada, L2A 5M6
Phone: 905-871-7111
Fax: 905-871-6181
E-mail: info@niagarasafety.com
Web: www.niagarasafety.com
Contact: Frank W. Doan
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TCI TOOL & SUPPLY DIRECTORY - JULY 2000 - 48
(D) Niemeyer Corporation
PO Box 1477
West Chester, PA 19380-0037
Phone: 610-356-2672
Fax: 610-355-7200
Contact: Karl Niemeyer

(D) North American Engine Company
3003 Thurston Avenue
Greensboro, NC 27406
Toll-Free: 800-543-2289
Phone: 336-370-4776
Fax: 336-370-4993
E-mail: niene@value.net
Contact: James L. Hamrick

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(D) North Coast Engines, Inc.
26781 Cannon Road
Cleveland, OH 44146
Toll-Free: 800-261-SPRAY (7772)
Phone: 216-772-1390
Fax: 216-772-1391
E-mail: info@northcoastengines.com
Web: www.northcoastengines.com
Contact: Richard Kuhn

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(D) Northeast Shade Tree
PO Box 4434
100 Albany Street
Portsmouth, NH 03802-4434
Toll-Free: 800-841-2498
Phone: 603-436-4804
Fax: 603-436-1493
Contact: Jeffrey W. Ott

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(D) Northeastern Associates
50 Notch Road
West Paterson NJ 07424
Toll-Free: 800-261-SPRAY (7772)
Phone: 973-837-1390
Fax: 973-837-1391
Web: www.northeasternarborist.com
Contact: Vinc Dujets

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(S) Orchard's Edge
836 Arlington Heights Road, Ste. 233
Elk Grove Village, IL 60007
Toll-Free: 877-881-1426
Phone: 847-228-3886
Fax: 847-228-3889
E-mail: info@orchardsedge.com
Web: www.orchardsedge.com
Contact: Marcia Diverde

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(M) Oregon Cutting Systems
Div. Blount Inc.
PO Box 22127
Portland, OR 97226
Toll-Free: 800-547-7800
Phone: 503-653-8881
Fax: 503-653-4201
E-mail: sales@oregonchain.com
Web: www.oregonchain.com
Contact: Rhys Campbell

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(D) Outdoor Equipment Distributors Inc.
PO Box 58494
Raleigh, NC 27685-8494
Phone: 919-876-6937
Fax: 919-850-9163
E-mail: lawhit@oodinc.com
Web: www.oodinc.com
Contact: Matthew Machray

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(S) Oxford Capital
676 N Michigan Ave, Suite 3050
Chicago, IL 60611
Toll-Free: 800-433-6539
Fax: 312-943-6548
Marketing Office:
283 Franklin St, 4th Fl
Boston MA 02110
Toll Free: 877-272-6759
Phone: 617-426-3090
Fax: 617-426-3065
E-mail: excapne@aol.com
Web: www.oxcap.com
Contact: Peter Aransky

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(D) Pacific Arborist Supplies
(Canada) Ltd.
154 Riverside Drive
North Vancouver, BC
Canada, V7H 1T9
Toll-Free: 888-996-2299
Phone: 604-929-6133
Fax: 604-929-4617
Contact: Bill Stuart

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(D) Payeur Distributions Inc.
Ascot Corner PQ
5379 King East
J0B 1A0
Phone: 819-821-2015
Fax: 819-820-0490
E-mail: apyeur@videotron.ca
Contact: Pierre Fortin

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TWO TOOL & SUPPLY DIRECTORY - JULY 2000 - 49
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(S) Progress Leasing Company
PO Box 1037
4 Sentry Parkway
Blue Bell, PA 19422
Toll-Free: 888-670-2265
Phone: 610-260-4723
Fax: 800-713-3499
E-mail: sscott@erols.com
Web: PROGRESS-ONLINE.COM
Contact: Scott Hillman

(S) ProLease
6021 So. Syracuse Way, Suite 203
Greenwood Village, CO 80111
Toll-Free: 877-514-8740
Phone: 303-770-5718
Contact: Anthony P. Marban

(M) Quality Metal Products
846 1-20 West
Clyde, TX 79510
Phone: 915-893-2249
Fax: 612-252-4720
Toll-Free: 877-272-6747
Phone: 612-922-3810
Contact: Bruce Reeves

(M) Racine Hydraulic Tools/FCI
1101 Industrial Park Drive
Manchester, NH 03108
Toll-Free: 800-346-4175
Phone: 603-647-5000
Fax: 915-893-2249
E-mail: tkyle@redmax.com
Web: www.redmax.com
Contact: Don Kyle

(D/S) Rainbow Treecare - Scientific Advancements
2239 Edgewood Avenue South
St. Louis Park, MN 55426-2822
Toll-Free: 877-514-8740
Phone: 612-922-3810
Fax: 612-252-4720
E-mail: tprosser@rainbowtreecare.com
Web: www.rainbowtreecare.com
Contact: Tom Prosser

(M) Rapco Industries, Inc.
6000 NE 88th Street, Suite D-104
Vancouver, WA 98665
Toll-Free: 800-959-6130
Phone: 360-573-0090
Fax: 360-573-0046
E-mail: rapco_carbide@prodigy.net
Web: http://www.rapcoind.com
Contact: Ronald F. Blehm

Rapco Industries, Inc. manufactures carbide-tipped saw chain in all sizes for all applications.

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(M) Rayco Manufacturing, Inc.
4255 Lincoln Way East
Wooster, OH 44691-9954
Toll-Free: 800-392-2686 (US & Canada)
Phone: 330-264-8699
Fax: 330-264-3697
E-mail: rayco@raycomfg.com
Web: www.raycomfg.com
Contact: J. R. Bowling
Only Rayco builds the most complete line of high performance stump cutters and cutting teeth in the world for professionals who demand maximum field production and safety.

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(M) Rear's Manufacturing Company
PO Box 235
102140 Prairie Road
Eugene, OR 97402
Toll-Free: 800-547-8925
Phone: 541-688-1002
Fax: 541-688-1705
Contact: Jeff Rear

(M) Redmax - Komatsu Zenoah America, Inc.
4344 Shackleford Road #500
Norcross, GA 30093
Toll-Free: 800-291-8251
Phone: 770-381-5147
Fax: 770-381-5150
E-mail: dkyle@redmax.com
Web: www.redmax.com
Contact: Don Kyle

(D) Redneck Equipment Company Inc.
1300 Orange Road
Culpepper, VA 22701
Phone: 540-825-4401
Fax: 540-825-4411
Web: 1stpage.com/redneck
Contact: Allen Whetzel

(M) Remke Enterprises, Inc.
PO Box 9357
4807 Woodward Avenue
Downers Grove, IL 60515
Phone: 630-810-1662
Fax: 630-810-0947
E-mail: remkedg@aol.com
Contact: Jim Lutz

(M) Reemay Inc./Bio Barrier
PO Box 51170
Old Hickory Boulevard
Old Hickory, TN 37138-3651
Toll-Free: 800-382-8467
Phone: 615-847-7132
Fax: 615-847-7068
E-mail: biobarrier@reemay.com
Web: www.reemay.com
Contact: Jerry Dunaway

(M) Reemay Inc./Bio Barrier
70 Old Hickory Boulevard
Old Hickory, TN 37138-3651
Toll-Free: 800-25-ROOTS (257-6687)
Phone: 615-847-7000
Fax: 615-847-7068
E-mail: biobarrier@reemay.com
Web: www.reemay.com
Contact: Betty Eddins

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(S) Robert Squillaire Insurance Agency
86 Broad Street
Eatontown, NJ 07724
Phone: 732-542-2400
Fax: 732-542-0390
Contact: Robert Squillaire

(D) Robin Outdoor Power Equipment/ Carswell Distributing Corp.
PO Box 4193
Winston-Salem, NC 27115
Phone: 336-767-7700
Fax: 336-767-8802
E-mail: sales@carswelldist.com
Web: carswelldist.com
Contact: Carolyn Honeycutt

(M) ROOTSInc
3120 Weatherford Road
Independence, MO 64055
Toll-Free: 800-342-6173
Phone: 816-254-6000
Fax: 816-254-1408
E-mail: rinc@rootsinc.com
Web: www.rootsinc.com
Contact: Mike Davison

(S) Royal Horticultural Society
Ripley WOKING, The Gardens
Wisley
Surrey GU23 6QB U.K.
Phone: +44 (0)1483 224234
Fax: +44 (0)1483 217750
Contact: Librarian

(D) Royal Truck & Equipment Inc.
6910 Ri 309
Coopersburg, PA 18036
Toll-Free: 800-283-4090 (outside PA)
Phone: 610-282-4090
Fax: 610-282-8986
Web: www.royaltruckequip.com
Contact: Steve Haman

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(M) Sabre Saw Chain / John Deere Consumer Products
PO Box 7047
14401 Carowinds Boulevard
Charlotte, NC 28241
Toll-Free: 800-845-2970
Phone: 803-419-1418
Fax: 803-419-1480
E-mail: up99077@deere.com
Web: www.sabrechain.com
Contact: Chris Fehn

TCI TOOL & SUPPLY DIRECTORY - JULY 2000 - 51
(M) SawJammer Company
PO Box 11395
Baltimore, MD 21239-0395
Toll-Free: 800-867-9276
Phone: 410-325-6860
Fax: 888-473-8008
E-mail: trimmer@sawjammer.com
Web: www.sawjammer.com
SawJammer® Pro and SawJammer® Slip-On can prevent cut injury from many types of outdoor power cutting equipment such as brush cutters, lawn mowers and trimmers. See Our Ad in 4-Color Product Directory

(M) Schodorf Truck Body & Equipment Company
885 Harmon Avenue
Columbus, OH 43223
Toll-Free: 800-288-0992
Phone: 614-228-6795
Fax: 614-228-6775
E-mail: forestry@schodorftruck.com
Web: www.schodorftruck.com
Contact: Mike Cassidy
Manufacturer of the "Silver Knight" forestry body for over 59 years. Get the advantage of "DRS" (Dust Release System). Options include removable aluminum roofs, liftgates, crane, for all applications and more. Complete packages with chassis and demo specials. Attractive lease/purchase programs and delivery available. See Our Ad in 4-Color Product Directory

(M) S.D.P. Manufacturing Inc.
PO Box 44
537 West Walnut Street
Albany, IN 47320-0044
Toll-Free: 800-789-6253
Phone: 765-789-6213
Fax: 765-789-6253
E-mail: sdp@sdpmbg.com
Web: www.sdpmbg.com
Contact: John P. Raznic

(D) SelfHEAL, Inc.
104 Guy's Lane
Bloomburg, PA 17815
Toll-Free: 800-553-6778
Phone #1: 570-389-1814
Phone #2: 570-389-1040
Fax: 570-389-0126
E-mail: Romill@aol.com
Web: poison-ivy-protection.com
Contact: Bob Miller
Imagine Poison Ivy, Oak and Sumac protection and treatment for just pennies a day. Oral IvyTM can be money in the bank for you. Reduce Workers' Comp. claims, reduce absenteeism, improve safety, improve morale, and increase efficiency.

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Plain City, OH 43064
Toll-Free: 888-PICK-SCS (742-5727)
Phone: 614-873-6706
Fax: 614-873-4168
E-mail: sales@PICKSCS.com
Web: www.pickscs.com
Contact: Richard Deering

(D) Shelter Tree, Inc./Tree Care Products
60 John Dietzsch Boulevard
North Attleboro, MA 02763
Toll-Free: 800-720-8733
Phone: 508-699-6550
Fax: 508-699-6570
Contact: George Mellick
Northeast dealer for Wood/Chuck Chipper Corp. and J. P. Carlton stump grinders. Call us regarding used equipment. See Our Ad in 4-Color Product Directory

(M) Simonds Industries, Inc.
120 Pere Marquette Street
Big Rapids, MI 49307
Toll-Free: 800-343-1616
Phone: 231-796-4858
Fax: 231-796-4771
E-mail: REluskie@Simonds.cc
Web: www.Simonds.cc
Contact: Ray Eluskie

(M) Southco Industries
1840 East Dixon Boulevard
Shelby, NC 28150
Toll-Free: 800-331-7655
Phone: 704-482-1477
Fax: 704-482-2015
E-mail: Southco@Shelby.net
Contact: Richard P. Goforth
New and used chippers, stump grinders and bucket, chipper, log and crane trucks. Replacement parts and service. See Our Ad in 4-Color Product Directory

(D/M) Southeastern Equipment Company
4180 Highway 20
Buford, GA 30518
Toll-Free: 800-487-7089
Phone: 770-271-8286
Fax: 770-271-4496
Web: www.seequipment.com
Contact: Don Fowler
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(D) Tree Line Supply Company
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Akron, OH 44320
Toll-Free: 888-873-3546 (OH only)
Phone: 330-864-0342
Fax: 330-864-0771
Contact: Richard Woods

(M) Triangle Research Inc.
300 Lawrence Road
Hillsborough, NC 27278
Phone: 919-732-1388
Fax: 919-732-1349
E-mail: info@triangleresearch.com
Contact: Matthew Johnson

(D) Tree Management Systems Inc.
4257 West Delap Road
Ellettsville, IN 47429
Toll-Free: 800-933-1955
Phone: 812-876-7634
Fax: 812-876-3565
E-mail: sales@turftrue.com
Web: www.turftrue.com
Contact: Jon Garner

Web: www.turftree.com

(E) Tree Management Systems Inc.
1879 SW 18th Avenue
Williston, FL 32696
Toll-Free: 800-642-5438
Phone: 352-528-0777
Fax: 352-528-5335
E-mail: trueco@shelby.net
Web: www.trueco.com
Contact: Matthew Johnson

(M) Tree Line Supply Company
17425 SW Pilkington
Lake Oswego, OR 97035-5357
Toll-Free: 888-635-8733
Phone: 503-635-0063
Fax: 503-635-0084
E-mail: info@treetools.com
Web: www.treetools.com
Contact: Larry Campbell

(S) TreeSage.com
4848 South Highland Drive, #516
Salt Lake City, UT 84117
Phone: 801-272-5172
Fax: 801-272-9312
E-mail: sales@www.treesage.com
Web: www.treesage.com

(M) Village Blacksmith/Olympia Industrial Inc.
505 South Seventh Avenue
City of Industry, CA 91746
Toll-Free: 800-888-8782
Phone: 626-336-4999
Fax: 626-336-4899
Contact: Bert Kenyon

(M) V & H Inc.
PO Box 289
406 Air Park Drive
Prentice, WI 54556
Toll-Free: 800-622-2613
Phone: 715-428-2238
Fax: 715-428-0771
E-mail: v4horses@win.bright.net
Web: www.v4h.com
Contact: Dave Balthazar

(M) Vermeer Manufacturing Company
PO Box 2001210
Vermeer Road East
Pella, IA 50219
Toll-Free: 888-VERMEER (837-6337)
Phone: 515-628-2141
Fax: 515-628-2100
E-mail: salesinfo@vermeer.com
Web: www.vermeer.com
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(D) V & H Inc.
17425 SW Pilkington
Lake Oswego, OR 97035-5357
Toll-Free: 800-635-8733
Phone: 503-635-0063
Fax: 503-635-0084
E-mail: info@treetools.com
Web: www.treetools.com
Contact: Larry Campbell

(M) Vermeer Manufacturing Company
160 Baker Creek Place
Bellingham, WA 98226
Toll-Free: 800-268-2141
Phone: 360-734-5242
Fax: 360-733-6311
E-mail: wesspur@wesspur.com
Web: www.wesspur.com
Contact: Ryan Aarstol

(M) Vermeer Manufacturing Company
PO Box 2036
87601 Imperial Drive
Waco, TX 76702-0368
Phone: 254-399-2100
Fax: 254-399-2651
E-mail: stephenr@versalift.com
Web: www.versalift.com
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(D) Vermeer Manufacturing Company
PO Box 39
Woodbridge, NJ 07095
Toll-Free: 800-326-2711 (US & Canada)
Phone: 503-543-7114
Fax: 503-543-7110
E-mail: boots@westcoastshoe.com
Web: www.westcoastshoe.com
Contact: Curt Yaeger

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505 South Seventh Avenue
City of Industry, CA 91746
Toll-Free: 800-888-8782
Phone: 626-336-4999
Fax: 626-336-4899
Contact: Bert Kenyon

(M) Wall Safety Products
900 Oregon Street
Kannapolis, NC 28083
Toll-Free: 800-316-5944
Phone: 704-785-8484
Fax: 704-785-8486
Web: www.wallsafety.com
Contact: Wayne Allan

(M) Tree Tech Microinjection Systems
2828 NW Shoe Factory Lane
Scappoose, OR 97056-0607
Toll-Free: 800-326-2711 (US & Canada)
Phone: 503-543-7114
Fax: 503-543-7110
E-mail: boots@westcoastshoe.com
Web: www.westcoastshoe.com
Contact: Curt Yaeger

(T) Tree Tools
17425 SW Pilkington
Lake Oswego, OR 97035-5357
Toll-Free: 888-635-8733
Phone: 503-635-0063
Fax: 503-635-0084
E-mail: info@treetools.com
Web: www.treetools.com
Contact: Larry Campbell

(M) V & H Inc.
1480 Baker Creek Place
Bellingham, WA 98226
Toll-Free: 800-268-2141
Phone: 360-734-5242
Fax: 360-733-6311
E-mail: wesspur@wesspur.com
Web: www.wesspur.com
Contact: Ryan Aarstol

Weaver Leather, Inc.
PO Box 68
7540 County Road 201
Mt Hope, OH 44660
Toll-Free: 800-WEAVER-1 (932-8371)
Phone: 330-674-7548
Fax: 330-674-0330
E-mail: info@weaverleather.com
Web: www.weaverleather.com/arborist
Contact: Richard F. Kiefer

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Toll-Free: 800-888-8782
Phone: 626-336-4999
Fax: 626-336-4899
Contact: Bert Kenyon

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Phone: 360-734-5242
Fax: 360-733-6311
E-mail: wesspur@wesspur.com
Web: www.wesspur.com
Contact: Ryan Aarstol

Wall Safety Products
900 Oregon Street
Kannapolis, NC 28083
Toll-Free: 800-316-5944
Phone: 704-785-8484
Fax: 704-785-8486
Web: www.wallsafety.com
Contact: Wayne Allan

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Phone: 704-785-8484
Fax: 704-785-8486
Web: www.wallsafety.com
Contact: Wayne Allan

Triangle Research Inc.
300 Lawrence Road
Hillsborough, NC 27278
Phone: 919-732-1388
Fax: 919-732-1349
E-mail: info@triangleresearch.com
Contact: Matthew Johnson

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4257 West Delap Road
Ellettsville, IN 47429
Toll-Free: 800-933-1955
Phone: 812-876-7634
Fax: 812-876-3565
E-mail: sales@turftrue.com
Web: www.turftrue.com
Contact: Jon Garner

(M) Trueco, Inc.
115 Longbranch Road
Kings Mountain, NC 28086
Toll-Free: 800-642-5438
Phone: 704-739-9591
Fax: 704-739-1401
E-mail: trueco@shelby.net
Web: www.trueco.com
Contact: Butch Trice

Web: www.TreeMan.com

(T) Tree Management Systems Inc.
1879 SW 18th Avenue
Williston, FL 32696
Toll-Free: 800-642-5438
Phone: 352-528-0777
Fax: 352-528-5335
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Toll-Free: 800-94-ARBOR (942-7267)
Phone: 916-852-8900
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New Haven, CT 06519
Toll-Free: 800-770-5010
Phone: 203-782-5944 or 203-542-1100
Fax: 203-782-1616
E-mail: glen@MotherEarthOrganics.com
Web: www.MotherEarth.com
Contact: Glenn Battin

(M) Wilsons Woodcutters Supply
X3 Saw Chain/
Div. Wilsons Woodcutters Supply
812 Monroe Avenue
Rochester, NY 14607
Toll-Free: 800-560-9035
Phone: 716-473-5962
Fax: 716-473-5631
Contact: Dave Aurand

(M) Wis-Con Total Power Corporation
PO Box 181160
3409 Democrat Road
Memphis, TN 38118-1160
Toll-Free: 800-932-2858 x4086
Phone: 901-365-3600
Fax: 901-369-4050
Web: www.totalpower.com
Contact: Dell Roberts

(D) Wood's C.R.W. Corporation
PO Box 2186
1879 Williston Road
South Burlington, VT 05407
Phone: 802-658-1700 x1312
Fax: 802-862-6076
E-mail: oakred@aol.com
Web: www.machinerytrader.com/woodscrwcranes
Contact: Chris Palmer

(M) V.A. Wolf Inc.
1203 Isabel Street
Burbank, CA 91506
Toll-Free: 888-494-4969
Phone: 818-849-0012
Fax: 818-567-0039
Web: www.wolfclaw.com
Contact: Vincent A. Lupo

(M) Wood/Chuck Chipper Corporation
PO Drawer 279
Shelby, NC 28151
Toll-Free: 800-269-5188
Phone: 704-481-1465
Fax: 704-482-7349
E-mail: woodchuck@shelby.net
Web: www.woodchuckchipper.com
Contact: Chad Spangler
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8180 West 10th Street
Indianapolis, IN 46214
Toll-Free: 800-553-0182
Phone: 317-271-1542 x164
Fax: 317-273-7024
E-mail: woodmizer@woodmizer.com
Web: www.woodmizer.com
Contact: Kevin Corder

(M) Woodsman Inc.
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Clare, MI 48617
Toll-Free: 800-953-5532
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Fax: 517-386-9487
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Biddeford, ME 04005
Toll-Free: 800-255-9253
Phone: 207-282-3396
Fax: 800-255-9253
E-mail: christine@yalecordage.com
Web: www.yalecordage.com
Contact: Richard W. Hildebrand

(M) Zenith Cutter Company
5200 Zenith Parkway
Loves Park, IL 61111
Toll-Free: 800-223-5202
Phone: 815-282-5200
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