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Welcome to the New Millennium

Whether you celebrated the millennium on 1/31/99 or are holding out for the 1/31/00 date, your calendars all say we're now in the year 2000! Life and business haven't changed drastically in that small moment, but psychologically, it's symbolic of a new historical measurement of "how things were done."

Lately, I've been reading about how my house is soon going to start talking to me. Not only will I have to go out and get a new TV or have a digital converter box added, but my refrigerator will eventually tell me that the milk has spoiled. And my cell phone will be able to do everything from unlocking my house to telling me that I haven't vacuumed often enough (to be verified by my husband, for sure). I'm not altogether certain I'm ready for talking houses with interchangeable, pre-wired walls that will be ordered like a sweater from L.L. Bean.

What I do know is that with the turn of the century and the rapid changes coming down the pike, keeping up is not an option. It's a requirement—in business and personally—for survival. NAA is striving to keep up with all the business changes in service industries in order for us to prepare you.

I thought I'd share with you an edited version of a popular e-mail that is running around in cyberspace. It's a summary of a survey that Beloit College in Wisconsin does each year to familiarize the faculty with the incoming undergrads. If you didn't already feel like you were born in one time and are living in another, take a look at what the freshmen this year don't have in their memory banks. You need to know about them—they're your new hires in this new millennium:

1. They were born in 1980 and have no recollection of the Reagan era...but Sony introduced the Walkman that year.
2. Black Monday 1987 is as significant to them as the Great Depression.
3. They have never feared a nuclear war. They were 11 when the Soviet Union broke apart, and they don't remember the Cold War.
4. They are too young to remember the space shuttle blowing up.
5. Tianmen Square means nothing to them.
6. Atari pre-dates them, as do vinyl albums. The expression "you sound like a broken record" means nothing to them. They have never owned a record player.
7. Star Wars looks very fake to them, and the special effects are pathetic.
8. They have always had an answering machine.
9. Most have never seen a TV set with only 13 channels, nor have they seen a black and white TV. They have always had cable.
10. There have always been VCRs, but they have no idea what Beta is.
11. "The Tonight Show" has always been hosted by Jay Leno.
12. They never saw Larry Bird play basketball, and Kareem Abdul-Jabbar is a football player.
13. They never took a swim and thought about "Jaws."
14. The Vietnam War is as ancient history to them as WWI or WWII. They were pre-pubescent when the Persian Gulf War raged.
15. They have no idea that Americans were held hostage in Iran.
16. They can't imagine what hard contact lenses are.
17. They do not care who shot J.R. and have no idea who he is.
18. The Titanic was found? They thought we always knew where it was.
19. There has always been MTV.

Add to that: they have never known anything but the computer age; milk doesn't get delivered to their door; recycling is a way of life; the Internet is the way to do research; Generation X's entrance into the job market is almost over; and they don't know anything but a low unemployment rate and competitive wages.

You have great young people waiting to join the tree care industry who need to be reached in a completely different way.

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A new study compares methods and machines to measure decay in trees.

NAA FORUM

News, events and happenings from the National Arborist Association.

FROM THE FIELD

By Jon Sabin

An intrepid arborist turns a nasty feud between neighbors into a public relations and personal success.

THE SCIENCE OF TREE CARE

Dr. Alex Shigo discusses the need for arborists to understand the science behind the practice of professional tree care.

IS STORM DAMAGE A POT OF GOLD?

During the slow season, tree care company owners' thoughts turn to the profits made in cleaning up after storms. But first, consider this ...

TCI's mission is to engage and enlighten readers with the latest industry news and information on regulations, standards, practices, safety, innovations, products and equipment. We strive to serve as the definitive resource for commercial, residential, municipal and utility arborists, as well as for others involved in the care and maintenance of trees. The official publication of the non-profit National Arborist Association, we vow to sustain the same uncompromising standards of excellence as our members in the field, who adhere to the highest professional practices worldwide.
In With the New!
By: Jeffrey Lee, Branch Management, Riverside, CA (909) 276-8060
Branch Management—specializing in educational programs and training for the tree care professional

Sponsored by The Bishop Company for the advancement of our industry.

"Ahh, another fine winter morning," remarked Big Al Fontaine's number one man, Max Bunyan, as he whistled his way onto the Widow Carter's property to trim the now dormant sycamore tree standing like a sentinel in the center of her front yard.

Something about this morning made Max especially excited. The bright sun, bluer skies, and crisp morning air made the fluent motions of a seasoned climbing veteran even that much more spectacular. He worked the tree with his new climbing aids and other assorted gadgetry he managed to receive over the holiday seasons. Feeling no need for instructions or demonstrations, Max took his new booty to the summit of the tree. His new hardware jingled and chimed with every choreographed move. The hardware hung off the back of his climbing belt like lures broken off at the leader (on a submerged log) and hanging off the lip of a wise old granddaddy big-mouthed bass.

Suddenly, without warning, his climbing aid seemed to relax its grip on the rope and Max started to fall. He grabbed at his ropes to slow his rapid descent: instantaneously, the rope was coated with deposits of bloodied bits and pieces of skin from his palms and fingers. Letting go once more (and still a mere 40 feet to go!), Max picked up speed as he screamed (teeth chattering), flailed, kicked his legs and flapped his arms! Years of thoughts and memories zapped through his mind with lightening speed. Traveling earthbound like a comet, Max (seemingly all out of choices) resorted to his years of service in the U.S. Marine Corps: P.L.F! (Parachute Landing Fall). He hit the ground and rolled like he was shot out of a cannon across the Widow Carter's front yard!

Max's unscheduled descent could have been avoided with a few simple precautions:

Read Instructions: Even though the excitement of having a new piece of equipment added to your arsenal has taken over your ability to think, take a deep breath and read the manufacturer's instructions on use, limitations, and maintenance. Learning by trial is usually the primary ingredient in a recipe for disaster.

Inspect Equipment Before Each Use: Now that you have read the instructions and have spent considerable time "getting used to" the workings of your new-found friend, remember the basics of inspection. Look for signs of wear and defect, the manufacturers' instructions will usually provide clues on what to look for.

Proper Application: Most of the industries newest additions seem to be very specific on its intended application. First, buy the right equipment for the right application and (most important), be sure that your new item meets the ANSI requirements.

**Bishop Company’s NEW Ascending/Tending Kit**

This NEW Ascending/Tending kit performs many of the same functions provided in climbing aids costing hundreds of dollars.

With the ascending/tending kit installed properly, each pull of the ascending body thrust climber's line causes the ascending/tending micro-pulley to advance the climber's knot automatically. With a simple adjustment of the ascending/tending lanyard, the system becomes a slack tender for the climber walking back in on a limb. Bishop Company's NEW ascending/tending kit comes with everything you need to create your own ascending knot tender and a slack tender system. Complete with instructions.

**Kit contains 7mm lanyard, micro-pulley, mini-carabiner and instructions**

**Ascending/Tending Kit .... ONLY $13.82 ea.**

Offer expires February 29, 2000

For the Next Millennium—All Of Your Arborist Needs

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There has been a considerable amount of debate recently, at public meetings and in the press, about the use of herbicides by the utility industry. The main thrust of this debate has been that all herbicides are bad for people and the environment. Citizens groups, such as Toxins Action Center, Herbicide Free Power Lines and others, are expressing their concerns to the utilities and their state government. Most of these groups list a variety of reasons why herbicides / pesticides should not be used, including:

1. The testing of approved herbicides is insufficient and outdated.
2. Chemicals in combination are more toxic than individually, yet they are tested individually.
3. Crop damage from over-spraying has occurred and private wells are at risk.
4. People use trails that cross power lines where spraying is not posted.
5. Childhood cancer and asthma are on the rise.

This list could go on, but one gets the gist of their feelings. Some of their concerns have some basis in fact—drift to non-target areas is unacceptable and sprayed areas could easily be posted. Many of the concerns, however, show a complete lack of faith in both corporate America and in government agencies. These beliefs can lead to very heated public meetings at which all involved parties—utility companies and anti-pesticide groups—seem to leave the meetings upset and confused.

"... the [Worthington] Conservation Commission, which called the meeting, said it is satisfied that the plan is safe and is not convinced that the people who have expressed their concern speak for the majority of residents. In response, MW is launching a petition drive against the use of herbicides with the help of the Toxins Action Center." Berkshire Gazette 3-22-99

Why manage ROW?

What most of the people protesting chemical Right-of-Way (ROW) management do not realize is that the utility
A properly maintained ROW can and should be environmentally sound, provide good line clearance and be aesthetically pleasing to the public.

While mowing gives a ROW plenty of line clearance, it certainly is not aesthetically pleasing to the eye.

industry is required by law and the threat of litigation to keep vegetation away from their utility wires. Electric lines that come in contact with trees cause reliability and safety problems for the utility company and the general public. A tree growing in contact with electrical wires can conduct electricity. People on the ground or children climbing in a tree adjacent to electric lines have come in contact with the electricity and been electrocuted. The state of California has had many cases where forest fires were the result of conflicts with electric wires.

Reliability is also a major issue. Today, the public and businesses are more dependent than ever on a steady and reliable flow of electricity. When the lights go out, so do the computers, medical apparatus, traffic signals and the air traffic control systems. The bottom line is the utility industry is required to keep the electricity flowing both safely and reliably. If they fail, they are held accountable.

Trying to have an open-minded debate concerning herbicides is similar to trying to review abortion or gun control. There are still people in the business—fortunately, very few—who believe they should be able to spray whatever they want, whenever they want. At the opposite end are citizens who believe all pesticides are bad and should be banned. Quite frankly, advocates of responsible pesticide use are not going to win the debate with either of these minority groups. Their minds are closed, and they do not want to be confused by the facts. The industry needs to educate both the ROW managers and the general public, most of whom are in the middle and open to factual information.
ROW management strategies

There are basically three ways to maintain a ROW—mechanical, chemical or biological / integrated. Each of these systems has advantages and disadvantages with respect to financial considerations, environmental effects and worker safety.

Mechanical

Maintaining a ROW using mechanical means is as old as utility wires, starting with telegraph lines in the late 1800s.

With saws, ROW technicians can remove individual plants and thus be selective. On level terrain with many stems, this would be an expensive way to remove tall trees. But on steep or rocky areas, this may be the only way to do the job. Unfortunately, working on a steep slope with a chain saw or brush cutter—especially in a rocky area—can be very dangerous work for a ROW technician.

Mowing can be more cost effective on level ground, but it leaves the site looking like a war zone. The biggest problem with using a mechanical means to maintain a ROW is the response of the trees to being cut down, as a result of the top/root ratio. Trees re-sprout from the cut stump because the roots are left healthy and intact in the ground. Farmers and foresters have used this system for centuries to produce fast-growing firewood. The practice is called coppice. Tree and woody brush density is increased as a result of not killing the root system. If their root systems are not controlled, it is not uncommon for tall trees such as oak, poplar or maple to grow more than ten feet in the first year following mechanical cutting.

While mechanical cutting needs to be used on some sites, in most situations it is not a first choice because of the problems it can produce.

Mechanically cut woody vegetation will re-sprout in most cases if it is not treated with a root-killing herbicide.
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60' Working Height
Aerial Lift of Conn AL-50
1992 Ford F700 6.6 Diesel
6 Speed Transmission

Please circle 25 on Reader Service Card
Chemical treatments became widely used following World War II. Post-war America was very proud of new cures for old problems—antibiotics for our children, DDT to control gypsy moths and 2, 4-D to manage our ROWs. Obviously, everything did not work out quite the way it was planned. Pesticide users made mistakes then, but herbicides properly used are a tool that can maintain ROW vegetation in a financially acceptable, safe and environmentally sound manner.

There are currently three medium- to low-density programs being used by utility systems today to maintain ROW lines.

1. **Cut stump**
   This technique, often called "cut & squirt" by the ROW technicians, is especially suited for individual tree removal alongside ROW lines or in populated areas. It eliminates leaving dead tree skeletons standing. The tree worker fells the tree and the freshly cut stump surface is treated with a herbicide. The treatment is usually done with a hand sprayer, employing very little active ingredient per stump. The result is that the roots are killed and there is very little re-sprouting. Pre-mixed and no-freeze formulations are available for year-round use. Most formulations contain a dye that makes it easy to see where the herbicides have been applied.

2. **Low-volume basal**
   This is an effective treatment method that allows the technician to target only problem plants that could grow up into the lines without affecting neighboring, low-growing shrubs, grasses or herbaceous plants. Re-sprouting is controlled and this system can be used year-round, conditions permitting. One disadvantage is that this technique leaves dead vegetation standing.

3. **Low-volume foliar**.
   When many of us think of foliar sprays, we remember the old days of total brownouts along the entire ROW. Fortunately, most utility companies today do not advocate this practice. If your ROW is located in an area where you can tolerate minimal brownout, then low-volume foliar treatments can be used effectively to control low to medium vegetation.

   The ROW technician usually applies the herbicide to individual plants using a backpack sprayer at close range. This system allows for selective spraying, which protects non-target plants while killing the roots of tall-growing trees.

   The above programs can be used in sensitive areas, will kill the roots of tall-growing trees and are cost effective.

**Biological / Integrated**

Most utility ROW managers and the general public would agree that the best method to use on a ROW is a biological...
or integrated approach. Managing a ROW in this manner encourages the creation of dense, low-growing plant communities. Biodiverse plants such as grasses, ferns, herbaceous wildflowers, blueberry and bayberry bushes and low-growing trees like dogwoods are encouraged. Tall-growing trees that have the potential to grow up into the ROW lines would be aggressively discouraged.

The methods used to control tall-growing trees would be mechanical and chemical. Tall trees are removed to encourage low, dense growth. This type of management reduces the seeding in of new trees because the groundcover does not allow the light necessary for trees' seeds to germinate.

Once this dense growth of low plants has been established, it is very easy to maintain the dense ground vegetation with periodic treatments using low-volume herbicides. The chemicals used to maintain a ROW in this manner would be less than what the average suburban homeowner spreads on his lawn.

In analyzing the use of herbicides on a ROW, one has to take into consideration the cost / benefit of using herbicides and the cost / benefit of not using herbicides. For every cost—financial, environmental, worker safety—there should be a benefit that outweighs any negative aspects of the treatment. Yet one has to take into consideration that sometimes the cost of not doing something is steeper in the same areas than doing the debated treatment. Remember, the utility industry is required by law to keep their electric lines safe and reliable. So, if herbicide treatments are banned, how will they keep electricity flowing safely and reliably, and what will alternative treatments cost electric consumers, utility workers and the environment?

**Cost / Benefit**

If one assumes that the ultimate goal of the concerned public and ROW managers is to manage ROWs based on the biological or integrated approach, then one needs to look at the cost / benefit ratio based on that strategy. Integrated ROW management can help improve public relations and, at the same time, help the utility man-
Manager in the following ways:

1. **Aesthetics**
   A ROW containing trees and bushes that is mowed will look terrible, especially when compared to a ROW that is well maintained with low-volume herbicides. While a mowed ROW may make the utility company happy, most of the general public will find the view upsetting.

2. **Safety**
   Worker safety is or should be a priority with all utility companies and contractors. Working with chain saws and mowers on a rough site can be very difficult and dangerous for workers. Integrated ROW management will increase worker safety and reduce serious accidents.

3. **Environmental issues**
   **Water:** One of the public’s major concerns is how herbicides will affect water quality. There are herbicides that are registered for use near and on water. If the ROW is in the vicinity of water, situations may arise where conventional herbicides cannot be used and alternative methods are needed. If water is an issue, then the ROW manager will need to consider a material that is compatible with the specific site.
   
   Keep in mind that, in most cases, the alternative to not using herbicides is to mow the site. Mowing can result in rutting and erosion problems, leading to a degradation of water quality of a different sort.

   **Birds & animals:** When grasses and ground-hugging plants flourish, wildlife does too. Anyone who has spent time outdoors and has flushed a deer from its bed or had the pleasure of watching rare birds or butterflies knows that you will not find this biodiverse habitat on a mowed ROW.

   The fall 1997 issue of *News from Hudsonia* had an article entitled “Untapped Power: Rare Species in Utility Corridors, which noted: “Rare species and natural communities on and near power line cuts (ROW) would benefit greatly from information-sharing and cooperation among amateur naturalists, research scientists, and utility management decision-makers. Nature lovers should not shy away from utility corridors in the belief that they are too disturbed to be interesting. Indeed, we may find that many populations of rare species will yet be discovered in the unlikely context of power line paths.”

   Environmental concerns play a more prominent role than ever in the day-to-day activities of a ROW manager. Society better understands the importance of protecting the quality of the environment and natural resources. But when the environmental site is a ROW, maintenance and ease of access are also important. The key to a successful ROW management program is to balance the needs of nature and the needs of the public to have an adequate supply of electricity.

**Conclusion**

Pesticides are tools, just like chain saws or lawn mowers. If used properly, ROW herbicides are safe for the ROW workers and are environmentally friendly. If used improperly by untrained or uncaring workers, they can become a problem for the worker and the environment.

When considering the use of a herbicide for ROW maintenance, one must weigh the total cost of using this tool—for the worker and the environment, as well as the bottom-line cost. Then weigh the cost of alternatives. Herbicides have a legitimate place in most ROW maintenance plans.

H. Dennis P. Ryan is a professor at the University of Massachusetts, Department of Natural Resources Conservation, in Amherst, Mass.
Ergonomics Under Review

On Dec. 1, 1999, OSHA’s proposed Ergonomics Standard took a giant step toward becoming a regulation. Industry groups such as the National Coalition on Ergonomics (NCE) fear that OSHA has grossly underestimated the effect the Standard will have on the American workplace. The NCE and others have formally objected to the limited timeframe for participation in the rulemaking as well as the timing of its release.

The Ergonomics preamble and proposed rule were published in a supplement to the Dec. 1, 1999 Federal Register. Their combined length is 313 pages. The public comment period is supposed to end on Feb. 1, 2000. On Feb. 2, hearings are scheduled to start in Washington. The deadline for filing a notice of intent to appear at the hearings is Jan. 24.

In its proposed regulation, OSHA has limited the covered jobs to general industry, and specifically to manufacturing production jobs, manual handling jobs, and other jobs where OSHA-recordable MSDs are reported. Tree care employers are “automatically” covered to the extent that they have jobs that require manual handling. Manual handling jobs involve regular lifting of heavy loads.

The typical MSD is caused by repeated exposure to ergonomic risk factors—OSHA’s proposed rule recognizes the factors of force, repetition, awkward or static postures, contact stress, vibration and cold. Other factors not related to the work, such as bad posture or even genetics, can hasten the onset of symptoms. MSDs are further characterized as being, or becoming, chronic in nature; that is, the effects may last a long time or even be permanent.

By contrast, the typical injury is caused by a single event, and its effects are acute but usually short-lived. Injuries covered by the proposed standard do not include those caused by slips, trips, falls, being struck by objects, or other similar accidents.

OSHA has had over ten years to prepare the document and review literature on the subject, as well as to prepare even more massive documents, such as the regulatory flexibility and economic impact analysis, which is apparently over 1600 pages long. Accordingly, NCE has requested that public comment period be extended to at least 180 days, and the start of the public hearings be postponed until 90 days after the close of the formal comment period.

During a major holiday period when many individuals will have limited time to work on this issue, the schedule becomes an unreasonable imposition. The requested extension of time for the written comment period and the hearings is necessary to allow interested parties to analyze OSHA’s information and prepare thorough and complete comments and testimony.

Economic studies by each industry affected by the proposal must be completed to respond to OSHA’s economic impact statement. Significantly, the Small Business Regulatory Enforcement and Fairness Act (SBREFA) panel and the Small Business Administration contractor who examined OSHA’s economic analysis roundly criticized the Administration’s findings.

Last September, the NAA polled its members regarding the incidence of musculo-skeletal disorders (MSDs). Its purpose for surveying members about this category of injury was to develop industry-specific information that will help guide the Association’s governmental affairs efforts relative to OSHA’s proposed ergonomics standard, as well as to develop a statistical basis with which to help members with loss prevention and safety.

Data from the NAA survey included office workers and field technicians. About 95 percent of companies responding, representing 1766 employees, had not experienced any MSDs in 1998. Only five percent, representing 6,345 employees, experienced a total of 57 back injuries and six other lost work day (LWD) MSDs. These data represent an annual LWD incidence rate of 7.8 LWD MSDs per 1000 full-time employees (FTE).

By comparison, in 1996, nurses’ aides, orderlies and health care attendants, who spend much of their time lifting patients, had an annual LWD MSD rate of 31.6 per 1000 FTE. Production jobs in manufacturing experienced LWD MSD rates between 16.2 and 34.6.

Industry’s requests for more time seem entirely reasonable in light of the fact that OSHA is considering a proposed regulation that will eventually affect every business in the nation.

Peter Gerstenberger is director of business management, safety & education for the National Arborist Association.

1998 LWD MSDs in Tree Care*

<table>
<thead>
<tr>
<th>Type of injury</th>
<th>Number</th>
<th>Avg. No. Lost Days</th>
</tr>
</thead>
<tbody>
<tr>
<td>Back</td>
<td>57</td>
<td>N/A</td>
</tr>
<tr>
<td>Elbow</td>
<td>2</td>
<td>18</td>
</tr>
<tr>
<td>Wrist</td>
<td>2</td>
<td>36</td>
</tr>
<tr>
<td>Shoulder</td>
<td>2</td>
<td>2</td>
</tr>
</tbody>
</table>

* - One of the incidents reported involved an office worker.
<table>
<thead>
<tr>
<th>Year</th>
<th>Make/Model</th>
<th>Condition/Notes</th>
<th>Price</th>
</tr>
</thead>
<tbody>
<tr>
<td>1987</td>
<td>Ford Under CDL</td>
<td>6.6 dsl, 5/2sp, 12' flat w/4.5-ton National Knuckleboom crane, 25' side reach.</td>
<td>$24,500</td>
</tr>
<tr>
<td>1985</td>
<td>Ford F700 V/8 auto</td>
<td>64,000 miles, 16-foot stake lifigate and 3.5-ton Pitman Knuckleboom. 24-foot side reach.</td>
<td>$15,500</td>
</tr>
<tr>
<td>1989</td>
<td>Peterbilt Cummins</td>
<td>13 speed, 24-foot rollback. Good Condition.</td>
<td>$29,500</td>
</tr>
<tr>
<td>1992</td>
<td>GMC Topkick</td>
<td>3116 Cat 6/2 sp. VST 45 Versalift.</td>
<td>$36,900</td>
</tr>
<tr>
<td>1995</td>
<td>Ford F8000 Cummins</td>
<td>dsl 5/2 sp. 33 GVW 16' steel flat.</td>
<td>$24,500</td>
</tr>
<tr>
<td>1991</td>
<td>International</td>
<td>4000 5speed, 29,000 GVW.</td>
<td>$13,900</td>
</tr>
<tr>
<td>1994</td>
<td>GMC Topkick</td>
<td>3116 Cat 6/2 sp. 30 GVW, 16-foot steel flat dump.</td>
<td>$22,500</td>
</tr>
<tr>
<td>1987</td>
<td>F800 V/8</td>
<td>5/2 sp. with 650 Altec 50-foot bucket and chip box.</td>
<td>$31,900</td>
</tr>
<tr>
<td>1992</td>
<td>LNT8000</td>
<td>7.8 diesel Allison auto. 5 sp. 6x6 all-wheel drive. 21k miles, bumper &amp; bed winch. 16 feet flat. Super nice.</td>
<td>$39,500</td>
</tr>
<tr>
<td>1987</td>
<td>Ford F800</td>
<td>Under CDL. V/8 5x2 sp. 12' bed and 4-ton Pitman Knuckleboom. 30' side reach. 61,000 miles.</td>
<td>$19,500</td>
</tr>
<tr>
<td>1990</td>
<td>GMC 8.2 diesel</td>
<td>auto tandem. 12+ ton National 500A. 66-foot Hook Height.</td>
<td>$34,500</td>
</tr>
<tr>
<td>1987</td>
<td>Ford LT 8000</td>
<td>7.8 diesel, 10 sp, 20-foot bed with 12.5-ton National crane. 101-foot hook height.</td>
<td>$48,500</td>
</tr>
<tr>
<td>1987</td>
<td>Ford LTS 8000</td>
<td>7.8 dsl, 13 speed tandem with 6.5-ton Hiab 140 crane. 21-foot side reach, 22-foot bed.</td>
<td>$34,500</td>
</tr>
<tr>
<td>1986</td>
<td>International</td>
<td>1954 DT466, 10speed tandem with 7-ton National knuckle boom. 25-foot side reach.</td>
<td>$19,500</td>
</tr>
<tr>
<td>1986</td>
<td>Mack MS200</td>
<td>diesel, 5sp/2sp with 4-ton Hiab crane. 22-foot side reach, 22-foot bed.</td>
<td>$14,500</td>
</tr>
<tr>
<td>1975</td>
<td>Ford LN700</td>
<td>V8, 5sp, A/B 4-ton Hiab crane. 16-foot side reach.</td>
<td>$8,900</td>
</tr>
<tr>
<td>1990</td>
<td>Ford F800</td>
<td>6.6 diesel, 5sp/2sp, air brakes w/51-foot Altec Model AN650 double bucket.</td>
<td>$32,500</td>
</tr>
<tr>
<td>1981</td>
<td>LNT90000-71 Detroit</td>
<td>8 speed tandem with 4-ton Hiab Crane Model 950.</td>
<td>$16,900</td>
</tr>
<tr>
<td>1990</td>
<td>Peterbilt 320</td>
<td>8.3 Cummins diesel auto with 5-ton Effer Knuckleboom crane. 18-foot dump body with high sides, lifigate.</td>
<td>$39,500</td>
</tr>
<tr>
<td>1989</td>
<td>LT80000</td>
<td>Narrow cab, steel hauler. Haul long logs from front to rear, 6 x 6 all-wheel drive, 7-8 dsl, auto, 37k miles w/6.5-ton IMT crane.</td>
<td>$44,500</td>
</tr>
</tbody>
</table>

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Shindaiwa introduces its new extended-reach P230 pole pruner. With its 110-inch overall length, the pole pruner has a reach of over nine feet with an additional eight to 12-inch optional length for impressive reach. The cutting chain is a 3/8-pitch, low profile and narrow kerf design that delivers clean quick cuts. The unit is powered by a 230-series, 1.1 horsepower powerhead that delivers speed and power, even in tough applications. The P230 comes standard with a 10-inch bar, 3/8-inch spur sprocket, a tool set for maintenance and a bar scabbard. For more information visit their Web site at www.Shindaiwa.com or call 503-692-3070.

Wood-Mizer’s small sawmill, Model LT15, now offers more choices for hobbyists and others looking for an affordable personal bandmill. Introduced in 1997 with a standard nine-foot bed, the model now comes with an 11-foot (3.3 meters) bed and an optional 15 hp Kohler gas engine combined with an electric start, making this mill a compact powerhouse. The 17-feet (5.2 meters) per minute feed rate in 12-inch (30 cm) red oak surpasses the standard 13-hp engine’s 15 feet (5 meters) per minute. It is the perfect addition for arborists who only use the mill on occasion. It is also an effective accessory to a larger unit for even greater daily combined production. Using the same blades as its bigger brothers, it can cut logs up to 28 inches in diameter or 11 feet long in its standard form, and virtually unlimited log lengths are available with the addition of extra five-foot nine-inch (1.8 meters) bed sections. For more information, contact Wood-Mizer Products, Inc., 8180 W. 10th St., Indianapolis, IN 46214-2400; Phone: 800-553-0182; Web site: www.woodmizer.com.

Eagle by AmeriQuip introduced its TRAX line of aerial lifts for use in small entry "backyard" areas. These self-propelled units are gas-engine powered and move via a pair of tracks to spread out their weight (up to 3,500 pounds / 1,588 kg.) Easy to operate, each drive track has independent controls and the lifts come equipped with proportional hydraulic controls and positive bucket leveling. It has a working height of up to 40 feet (12.19 meters) and its 36-inch (.92 meters) width allows it to maneuver through an open gate. The lifts include 360-degree rotation, hydraulic outriggers and ground-level entry. Emergency descent valves and operation controls are located at the bucket and base. Available in insulated and non-insulated models, the lifts meet or exceed all applicable OSHA and ANSI standards. For more information, contact AmeriQuip, 5600 West 88th Ave., Westminster, CO 80030.

Maneuverability and true zero-degree turning radius make Excel Hustler commercial mowers a leader in the turf industry. They also make them the choice for snow-removal chores. Winter attachments allow owners to take full advantage of their investment. Winter attachments include: V-Blade (60-inch) constructed of 11-gauge welded steel with two replaceable 3/16-inch steel scraper blades. Dozer Blade (60 or 72-inches wide, 3/16-inch reversible), which can be hydraulically positioned up to 30 degrees left or right. Snow Thrower (54 or 60-inch), which is PTO-driven and hydraulically controlled, and can throw snow in any direction within a 190-degree radius. Other attachments and accessories include ROPS Cabs, heaters, wheel weights, tire chains and a Sweepster Broom. Hustler 3000 and 4000-Series Front Mounts and Model 6400 Hillsider can operate all the winter attachments. The Compact Models 251K and 260K can be fitted with the Dozer Blade and Model 2500 can use either a 60- or 72-inch snow blade or the 60-inch V-Blade. For more information, contact Excel Industries, Inc., PO Box 7000, Hesston, KS 67062. Phone: 800-395-4757; Web site: www.excelhustler.com.
The Spade from Triple D Enterprises is a versatile piece of equipment that attaches to any brand skid loader and is designed to aid the transplanting of trees and shrubs. The design enables arborists to dig the correct size holes for container trees and large root balls. The shape of the spade assists in covering root balls using a minimum of labor. It can haul up to one-half yard of additional topsoil to finish the planting process. In addition to planting, the Spade can help in the construction of retaining walls and in digging trenches for drainpipe installation and irrigation. The worry-free attachment requires almost no maintenance. Just replace the digging teeth and go! The boom-like design and chain attachment makes it easy to unload at the planting site from a trailer or truck. For more information about The Spade, contact Triple D Enterprises, 130 Popes Lake Rd., Angier, NC 27501 or call 800-478-7077.

Buckingham Mfg., with the help of Peter Donzelli, Ph.D., is pleased to introduce its new climbing pole saw scabbard, Model 6517C. The new saw scabbard makes climbing and moving about in a tree much safer and easier. No longer will a climber have to rely on overhead limbs to hang a pole saw while moving into position to make a cut. Simply clip the scabbard onto your saddle, slip your pole saw into it, fasten the strap and you're ready to go. For more information or a copy of their new color catalog, contact Buckingham Mfg. at 607-773-2400 or visit their Web site: www.buckinghammfg.com.

STIHL's Model 020T chain saw is designed for arborists and utility workers who require high power, low weight and optimum balance. Its 2.15 cubic inch engine produces 2.2 hp and it weighs only 7.9 pounds. The saw is equipped with an attachment ring, single-lever master control (a first for a top-handle saw), side-access chain tensioner, lifetime warranted electronic ignition and easy-access air filter and carburetor adjustment. The adjustable chain oiler and STIHL's exclusive lightweight Ematic guide bar, when used together, can reduce bar oil consumption by up to 50 percent while providing maximum lubrication and longer wear. For more information, call 800 GO STIHL (800-467-8445) or visit their Web site at www.stihlusa.com.
And the winners are ...

The September issue of TCI magazine featured a Reader Survey and circulation promotion to a limited number of our subscribers. As part of the promotion, readers who returned the Business Reply Card were entered to win prizes totalling $1,000. And the winners are ...

✓ First Place - $500: John R. Voit, owner of Voit’s Tree Service in West Bend, Wisconsin.
✓ Third Place - $200: Russell Kruse, owner of Bears Lawn & Landscaping in Alamogordo, New Mexico.

Congratulations! Keep those cards and letters coming.

Call Backs

The following companies were incorrectly listed in TCI’s December Buyers’ Guide.

(D/S) Cal-Line Equipment Company
6010 South Front Road
Livermore, CA 94550
Toll-Free: 800-654-8749 (CA only)
Phone: 925-443-6432
Fax: 925-443-6573
Contact: Dennis G. Knoll
Bandit chippers, Carlton stump grinders, log splitters, shredders, mulchers, waste recyclers, new and used. Aerial lifts, truck- and trailer-mounted. Financing available.

(D) Arborist Supply House, Inc.
PO Box 23607
Ft. Lauderdale, FL 33307
Toll-Free: 800-749-9528
Phone: 954-561-9527
Fax: 954-561-9550
E-Mail: Wayhoyt@aol.com
Contact: Geri Hoyt
We stock tree-trimming equipment, i.e. Buckingham & Miller saddles, lanyards, climbers, ropes, Felco & Corona saws & pruners, poles & pole saws, at competitive prices. Also, horticulture books by Shigo, Pirone, Harris & Mattheck with a selection of tree disease and insect books, palm books, tropical tree books, and CD-ROMs.

Also, these companies are Associate Members of the National Arborist Association. Logos were inadvertently omitted.

Arbortech
B & G Equipment Company
Innovated Arborist Supply, Inc.
NESCO, Inc.
Progress Leasing/
Quaker State Leasing Company
Prostaffing
Robin Outdoor Power Equipment/ Carswell Import & Marketing Associates
Superior Diesel Inc.
Tree Feeder Division

Day of Service

Local arborists were among the 150 tree care professionals from across Illinois who donated their services and equipment recently to care for trees in historic Oak Ridge Cemetery in Springfield, Ill.

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What would you like to learn today?
Why should we use the Internet? Back in the mid-1990s, it was a great idea with a lot of potential. We are finally at the point where people are using the Internet—not only to retrieve information but also to make purchases. Slowly but surely, the Internet is something we can use in our businesses; not only to address the needs of our customers and clients, but also to use our time more efficiently.

What customer service basics can we apply to the Internet? If your Internet page is, for example, “Bob’s Tree Care” with the phone number and business hours, you have a Yellow Pages advertisement. Customers won’t learn anything unique from that Web page. If nothing else is there, it’s not worth your time and money. If you want to reach people through the Internet, you must give them something they can’t get by picking up the phone—something new.

Utilizing the Internet does not mean losing the personal connection with your customers. When people call with questions, give them answers. If they ask for more information, e-mail them a fact sheet. Clients should get an almost immediate, personal response with the information they need. If you have information on your Web site, your customers can access it when they get home from work. They don’t have to wait until the next business day. In this way, you extend your hours of availability without actually staying open later.

It bothers me a lot—and it probably bothers other people, too—that the technology in use today can be so impersonal. I hate calling a place of
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business and getting a recorded menu of buttons to push. If we aren't careful, the Internet will build that type of impersonal wall between our clients and ourselves. With care, you can keep that connection on the Internet and still give customers the ability to obtain information 24-hours-a-day.

The reverse is also true; you can provide information at any hour. Whether you are communicating via e-mail, or with information on the Web, take control of your time. If people are sending you e-mail, plan an hour in the morning and an hour at night to read and reply to your mail. At these times, you won’t be interrupted. There is still a sense of urgency, but you are in control.

Who are your clients? Do you want to compete with the “fly-by-night” guys with a chain saw and pickup truck? The Internet may not be an effective means of communicating with one-time clients who only care about low bids, but long-term clients are another story. They know you. They know your reputation. They know that you are a professional. These are the people who give you recommendations. They access information on your company from the Internet.

Dr. John Ball from South Dakota State University did a survey that discovered when people are satisfied with their service, they tell five other people about it. When they are dissatisfied, they tell nine to 13 other people. With e-mail, they can get on a list serve and send thousands of messages—whether they are satisfied or dissatisfied. If your clients are using your Web site, they might bring it up in other conversations. Satisfied clients will rave about your site.

The Internet is generally considered less helpful in attracting new clients. A Web site can give the perception of professionalism, but it won’t necessarily attract new clients. It is most beneficial in turning a one-time job into a long-term relationship. If you’re going to put your Web site out there, there is a chance that you will get questions from people very far away. It’s not called the World Wide Web for nothing. If you want to limit advertising to a small group, you may want to restrict yourself to the Yellow Pages or the local newspaper. You can advertise your Web site as a place to get more information, but don’t expect the site alone to bring you new business.

When e-mails for information do come in, answer them promptly. Everyone loves rapid, personal attention, and you need to be responsive to your customer’s requests and concerns. For example, I recently placed an order for a book from Borders.com. I am in graduate school and taking a class on the physiological ecology of plants. Borders had the book, and their Web site stated it would reach me in two or three days. Three days went by and there was no book. I returned to their Web page and noticed that they had changed “two to three days” to “five to seven weeks.” I sent an e-mail to ask what happened and their reply did not come to me for 48 hours. They told me I had read the Web site information incorrectly. I canceled the order. This was not satisfactory. Nothing was prompt or as promised. You need to provide a prompt response. You also need to maintain a personal touch.

Availability and follow up
E-mail or a Web site allows you to provide good follow up easily. Follow up, in the form of an e-mail, can be as informal or friendly as a phone call, but since it is written, it is perceived as a more formal reply. You can follow up individually to keep the personal touch and customers can print it out—satisfied and happy with your service.

Pricing and the cost of the service
Web sites won’t necessarily influence...
clients that want the cheapest price. However, if they go to a Web site and perceive us as professionals, they may reconsider and hire the more expensive—but more professional—company.

Professionalism and credentials

One advantage of using a Web site is the ability to link to other sites, pictures and authorities. You can advise a customer that a particular tree is a Frazier fir, and has a specific kind of pest problem. You can provide them a hyperlink that will take them directly to a fact sheet provided by a university or cooperative extension. In this way, you have automatically increased your customer's awareness and provided information that bolsters your professionalism and credibility.

E-mail

Many of us use e-mail every day. If you are not using it right now, you should be. It is simple, and it provides immediate information. Be thoughtful of the other person, however. Use it as an efficient form of communication, but if you want to chat, call them. Don't over use it.

Web pages as archives

That's what universities are doing. Information that doesn't change rapidly, like technical or scientific data, can be stored on a Web page so people can refer to it more than once. Static information still needs to be checked and updated from time to time, so pay attention to what you post on your site to make sure the information remains accurate and relevant.

Interactive media

We can use interactive media to obtain information from other companies. While we can use it from an educational point of view, I'm not sure a business Web site is the best place, when talking about the nuts and bolts of an Internet business.

Immediate consumer contact

When it comes to using the Web, I consider 24 hours as immediate. People expect that. They also expect access to good information. Through your Web site or e-mail, you can give your client information that is useful and available any time of day. The Internet never shuts down—although your access to it may be a problem depending on your Internet provider.

Developing an Internet presence

When I first started building a Web site back in the mid-'90s, there wasn't a lot of easy-to-use, Web-designing software. We had to code most of it on our own. I thought then that it would be really nice if someone would come up with...
a software program that would do all the coding for us. Less than a year later, they started to come on the market. Once it got to the point where the software did the coding, people started to develop Web pages on their own.

Training

The hardest person to train is you. I have high school kids as my summer help who have designed their own Web pages. The problem is they are summer workers. They leave and we have to catch up in our knowledge of the Web. There are many opportunities to do just that. Community colleges have courses where they talk about Web design and development.

Today's new computers have the software to develop a Web page. If you have Microsoft office, for example, you have the capability. Microsoft PowerPoint is a great software package. Just click the help button for a tutorial. I created a property map using lines in PowerPoint. With this one software package, I can essentially provide the inventory of all the plants on a property, put it on the Web, and add hyperlinks to information on the trees I have identified, what the pests are and the potential problems. The information can be updated easily, too. All I need to do is open it, add or change something, update the new version and I'm done.

Costs of software

Lots of software either is included on new computers or can be downloaded initially for free, at least until you test it and decide if you want to purchase it. If you want to test out new software, there is a great site called shareware.com. Shareware means you can try it for approximately 30 days before purchasing. There is freeware, too, which is software available on the Internet. Netscape started this trend by giving away older versions for free, and they cornered the market on Web browsers.

The cost of development is more a cost of time. Whether you have someone responsible for keeping your Web site up and communicating with your service provider or you do it yourself, that time will be calculated into development cost. Maintenance costs, as well. If you have information on your Web page, you are going to want to be sure it is up-to-date and accurate.

Outsourcing

In many cases, you can have a Web site set up on a separate server provided by another company, and you pay them to do your Web design. You have to provide them with the information and they do the development. You can outsource any of the activities you want to.

Internet blunders

1. Don't underestimate or overestimate the customers' Internet abilities. If you
Underestimate, people get frustrated. If you overestimate, people get frustrated. There is nothing more frustrating than finding you have to get a new Web browser to use a site. But the worst thing is to provide nothing new. If they can get the same information by picking up the phone, then that is what they will do. By providing something new, you also provide something on top of your field services.

2. Don't forget the personal touch. Nothing is worse than submitting a question and receiving a form letter back. Make sure you keep it personal.

3. Be sure to follow up. Nothing makes people angrier than being ignored. Prompt follow-up is very important.

4. Don't concentrate on the image and forget the content. If you put in a bunch of gimmicks to really make your site look great, it may get too complicated and the gimmicks don't help get your message across.

5. Avoid automatic opening. Have you ever clicked on a site and all of a sudden you have five new windows pop up? This is more annoying than helpful.

6. Limit Layering. When there are many layers packed into a site, it makes it hard to see what really is available.

7. Do you want Cookies? So-called Cookies provide information about you to people who own Web sites you are surfing. This is good for businesses who want to see where people are coming from and what parts of the site they access. Cookies help businesses track to see who is visiting. In that respect it's fine. However, in some cases, especially with advertising on commercial sites, they may provide information that you do not necessarily want to give when you are surfing.

8. Do you really need registration requirements? Some companies let you look at information without having to sign in. Others make you register and get a password. Most tree care companies won't need passwords, since they want to get their message out to as many people as possible. If you do need to add some type of registration to your site, keep it simple or ship it to an outsourcing unit. They can develop the form.

9. Use simple copyright statements. The University of Illinois uses a nice copyright statement which essentially states you can use their site for educational purposes, and the university is identified. Beware of getting too many attorneys involved. Also, beware of trying to cover so many bases that you forget the purpose of the Internet is to provide information to clients.

Before you embark on the Internet as part of your business, you must decide what you want out of it. Start off with e-mail, which will allow interaction with your clients and field staff, and, above all, maximizes your time. I prefer responding to e-mail to dealing with phone calls all day long. After that, decide what you want for a Web site. Provide something in addition to what you can give on the phone. Do something new!

John Lloyd is a research extension associate at Ohio State University. This article was excerpted and adapted from a lecture at TCI EXPO '99.
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You have just heard an employee is leaving and, unfortunately, it is happening with all-too-alarming regularity. You know turnover is disruptive and bleeds profits from the company’s bottom line, but you don’t know how to stop it.

Until you pinpoint the specific cause of turnover, you can’t eliminate its problems or reduce its cost. Departing employees have valuable information about the causes of turnover and ways to improve operations. Exit interviews can provide in-depth, candid and accurate information that is difficult to get from employees. The objective of an exit interview is to salvage something from the situation and learn what caused or motivated the employee to leave. Ultimately, you are looking for changes in company policies and management style that will reduce turnover.

Whether the interview is in person or by phone, the employee must be assured of confidentiality. Explain that his or her comments will be confidential and the specifics will not be communicated to the supervisor and, very importantly, will not affect any future reference. Only when the employee knows there will be no reprisals will he or she be honest and forthcoming.

The interview must be conducted by someone the employee feels is impartial and objective. The manager may be part of the reason the employee is leaving, and would not be perceived as objective. The employee may not feel comfortable sharing the real reasons for leaving with the manager. It is best for the company owner or a senior level manager to conduct the interview. In smaller companies, an accountant or businessperson outside the company could fill in and conduct the interview. Larger companies may use an outside consultant.

Prepare for the exit interview by outlining the questions. Use the questions listed in the sidebar as a guide to develop your own questions. Follow up the prepared questions to probe and determine the real reason the employee is leaving.

The most typical reasons for turnover are: not meeting basic financial needs, lack of competitive salary, inadequate benefits, poor communication, negative workplace, lack of recognition, unfair or inequitable treatment, lack of challenging job content, lack of job security or family/work conflicts. Other unique reasons might be health problems, relocation or personal reasons.

If the employee states low earnings as a reason, don't automatically conclude the problem is salary. Probe deeper to find out if earnings is really the symptom of something else. For example, a salesperson may state that low earnings and the compensation plan are not the problem, but inadequate sales skills or low sales activity may be the cause. You must uncover the real reason for turnover in order to determine the changes that will positively improve the work climate.

Examine the employee’s relationship with the supervisor. Determine if problems and complaints were communicated to the supervisor. In some cases they may have been caused by the supervisor. If complaints were taken to the supervisor, find out how they were handled, and if they weren’t, find out why.

It is important to examine the information from all exit interviews periodically and analyze it to spot trends or consistencies in locations and positions. Remember, it may be more than one factor that precipitates turnover. This kind of analysis will allow you to develop an overview to see patterns, trends and consistent factors causing turnover. Also, track the frequency of departures per unit or supervisor to see if some crew leaders have higher rates of turnover than others.
Don't take what is said in an exit interview at face value. Many departing employees may not be honest about their motives and objectives in their comments. Before you act to make changes, check information against other sources to verify its validity. You can compare what an employee says in an exit interview to what has been said in attitude surveys or has surfaced in previous conversations with supervisors. Look back at performance appraisals to find out if these or similar problems were identified before and if they were addressed.

Exit interviews can identify the reasons why people are leaving, but this information alone will not reduce the rate of turnover or decrease the cost of employee terminations. You must take action on this information. Carefully examine what you have learned, develop a plan to eliminate the problems and make the organization more attractive to current and future employees. Take the time to find the creative financial incentives, perks and benefits you can afford, which will increase the satisfaction level of employees. Don't just look at these factors, examine the job itself. If you find a pattern of resignations due to a lack of challenging job content, you may use job rotation or skill development to keep the employees challenged and allow for their growth.

It has been proven that an effective exit interview program will assist you in reducing turnover. Remember, interviews themselves will not reduce turnover, only the actions management takes as a result of them. If you are truly committed to reducing turnover, interviews are a valuable first step.

Wayne Outlaw, author of SMART STAFFING, can be reached at (800) 347-9361 or www.smartstaffing.net.
Arboriculture is a science and an art

Science is an orderly process of collecting, connecting and recording information about natural systems. Science is understanding. Science is mind.

Art is a process requiring skills to produce a product or performance considered attractive or pleasing. Art is doing. Art is muscle.

Arboriculture is the cultivation of trees. To cultivate healthy, attractive and safe trees both mind and muscle must be used. Arboriculture is an art and a science.

Arboriculture emerged as an art

Arboriculture emerged primarily as a skill, or art form, done by strong, working class people who were not afraid of hard work. It is time now to add science to the cultivation of trees.

The cell theory started biology as a science

The basic science behind all tree treatments is biology. Biology as a science started after the acceptance of the cell theory, then next came the germ theory and later the theory of evolution. The theory of genetics and the clarification of DNA have advanced biology to one of the leading disciplines of science today.

Biology is the study of living systems

Biology as a science means an understanding of the chemicals and chemistry of life. Trees are not only living systems, but they are the most massive, longest living and tallest living systems ever to grow on earth. They support more communities of other living systems than any other organism. The cultivation of such superior living systems must start with an understanding of tree biology.

Modern Arboriculture is tree cultivation based on an understanding of tree biology. The more you know about the way the system works, the better you can work on it.

Trees are forgiving

Trees are the most forgiving living systems on earth. They have been mutilated and injured by humans in countless ways, yet they continue to grow and to provide many benefits for humans, and
Trees are forgiving organisms. Trees are more than big sticks of dead wood. Trees do not heal, they compartmentalize infections. This process makes it possible for trees to outlive humans, even when constantly mutilated.

countless communities of other living organisms. However, as forgiving and as superior as they are in many ways, they do have their limits for survival.

Trees are super survivors

Survival is the ability to remain alive, often under conditions that have the potential to kill. Trees have never moved away from their problems. Trees have many associates and over time they have developed unsurpassed means for cooperation with them. Trees and their associates cooperate in synergistic ways. Synergy means that the whole is greater than the sum of the parts. Trees have also developed in ways that do not disrupt the law of increasing mass and energy. The law states that as mass of any system increases, the amount of energy necessary to maintain order in the system must increase at an exponential rate. Trees grow within their means. And, unlike humans, they never question or complain. They accept and adjust.

Trees have no healing system, in the sense of restoring injured and infected tissues. Trees are generating systems. Tree defense is centered about boundaries that form about infections, and that resist their spread. New tree parts are always in new spatial positions.

Humans keep putting humans at the top

Humans write books. Humans have written that humans are at the top of the line for living systems. Humans feel they are on the top position because humans have a large brain that can think. Humans run from danger. Humans are regenerating systems that restore injured and infected parts back in old spatial positions. Humans heal. Humans, at best, live about a hundred years. Most trees are still very young at the age of one hundred. I wonder how life forms would be ranked if trees wrote the books?

Humans have large brains

So, humans are supposed to be so great because of their big brain that can think, learn, make decisions, and predict events yet to happen. If all of this is correct, then what do trees have that make it possible for them to far outlive humans, and still not run from fires, floods and a long list of other destructive agents? What is the trees’ secret to long success?

Trees have defense as their theme

The basic advantage trees have is that they have evolved with defense as their theme. Their construction, physiology, chemistry, physics and all their other properties and processes have developed with defense as a theme. Humans have a big brain as their theme and trees...
have defense. The tree “secret” is a generating system built around defense and a ready capacity to adjust when their survival is threatened.

**Defense is a dynamic survival process**

Strong defense depends on a high amount of energy reserves. When energy reserves are low, defense is low.

Defense is chemistry. The cell theory is about cells as the basic unit of life. All multi-cellular organisms are made up of cells, which are, in a sense, bags of chemicals and chemical reactions. To try to understand biology without some understanding of chemistry is foolish. To understand tree biology, we must start with an awareness of the simple basics of chemistry. It is time to take the fear out of chemistry!

**Learn about the principles of life**

Along with chemistry, every arborist should be aware of the principles of life. The general principles of life are true for all living things. However, specific principles differ for each species. Defense is a general principle, but the specific ways animals defend themselves is different from the specific ways trees defend themselves. Another example is that all living organisms require an energy source. This is a general principle of life. Humans must get food already made, while trees make their own. Trees can store energy reserves only in living cells.

**Confusion of general and specific principles of life**

The major problem that has followed tree cultivation from its beginning has been the confusion of the general principles of life with the specific principles of life for trees, or worse yet, with the specific principles of life for humans. And, this has been so, because until very recently, little attention was given to tree biology, and especially tree anatomy. Anatomy must come before physiology.

Tree anatomy has been a problem because trees are so massive. Bits and pieces of trees have been studied in the laboratory, but entire trees have seldom been dissected. **Wood anatomy is different from tree anatomy!** Wood anatomy has been studied from the view of dead prepared samples in the laboratory. By tree anatomy, I mean entire living trees, again, *entire* living trees.

Tree dissections must be done outside with large, powerful tools. It is hard, physical work.

**Separation of academics and workers**

The problem is made worse because research people rarely associate with working people. The people who have university degrees seldom go outside to associate with tree people working in the field. (I have never been able to convince my research colleagues that a chainsaw is a research tool!)

The separation between the working
people and the university people has existed since the beginning of science. There are many good reasons for this, but now it is time to change this! Remember, trees are big, alive and they do grow outside.

New demands
Science advances as new tools, new ideas, and new demands of society connect. The people now demand tree work to be better, faster and less expensive. The only way to meet these demands is to be able to make better decisions faster. Better decisions faster means a better understanding about the way tree systems function. Now we are back to science, or the biology of trees.

The science behind the treatments
Fertilizers are chemicals. Water is a chemical. Mulch is a mass of ever-changing chemicals. Herbicides, pesticides and all other materials used to treat trees are chemicals. To even think about modern tree cultivation without an understanding of chemistry is folly indeed. Pruning also depends on an understanding of the tree system. The dose of pruning must, or should be, based on the ratio of living cells to dead cells in a tree, the dynamic mass to static mass ratio.

Needs for the future
There is little to be gained by dwelling on the problems of the past. It is time to look to the future and to direct our attention to better solutions. Here I list some ways to bring the art and science of arboriculture to a much higher level. I remain optimistic. I know many fine arborists who are working in these directions now. I hope that more people will join those who are trying to accomplish these goals.

1. Establish a strong and meaningful code of ethics. Violate it and you are out!
2. Base certification on the ability to perform at a specified high level. Violate the rules and you are out!
3. Develop bio-profiles for the most commonly grown trees.
4. Develop levels for arboriculture based on education and abilities.
5. Establish a pre-arboriculture core education program that will include some biology, chemistry, physics, soils, microbiology and other natural system subjects.
6. Develop better textbooks to serve the levels of arboriculture, and core education programs.
7. Increase the number of teachers capable of teaching biology, chemistry and physics in arboriculture classes.
8. Have more outdoor workshops where professors and workers connect,

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communicate and touch all parts of trees and soils.

9. Have more articles in trade journals written by people who are not selling products. Reduce the number of info-mercials.

10. Develop workplace education courses for people who are active, and often very successful in arboriculture but lack a scientific background. Many of these people are very intelligent, but they either left school early or were forced out of science courses because of the ways the courses were taught. Give them another chance.

Time for modern arboriculture

Arboriculture started when honest, hard-working people went out to prune, treat wounds and fill cavities. These three treatments have been the basic tasks of a working tree person. Pruning was done by cutting the branch flush to the trunk to promote "healing." Pruning wounds and other wounds were painted to prevent rot. Cavities were cleaned and filled to stop rot and help preserve the life of trees. Sad, but once you begin to understand just a little tree biology, you will realize that all of the old treatments did more harm than good. Remember, you cannot "feed" a tree, wounds do not "heal," roots do not regenerate, wounds do not "bleed," mycorrhizae are organs, and you cannot inoculate with organs and finally, wound dressings do not stop decay!

Ignorance of tree biology has been, and still is, the major cause of tree problems worldwide.

It is time for some changes. It is time for modern arboriculture. The trees need our help now. Connect with the greatest living systems ever to grow on earth.

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TCI EXPO offers opportunities for arborists to renew old friendships, establish new ones and discuss the latest advances in tree care.

Information on the care of trees and the nurturing of tree care businesses is on display at more than 175 booths.

(Above) Dwayne Neustaeter (left) and Robert Phillips (right) demonstrate advanced climbing.

From friction savers and saddles to chippers, fertilizers, trucks and tub grinders, everything an arborist needs was on display in Indianapolis.

Demonstrator Dwayne Neustaeter takes a question from the audience about climbing and rope applications.

Membership Development Coordinator, Charlotte Carrier, discusses the benefits of membership in the National Arborist Association.

Bob Cripe with Independent Prune describes how to install lightning devices in trees. Small, hard hands brought expert tree care to the
Opening reception at the restored Union Station was an architectural and Epicurean delight.

Dr. Ed Gilman, shown here discussing proper pruning practices, was among the tree care and small business experts who shared their experiences with attendees.

Experts in every facet of tree care were available on the show floor to demonstrate the benefits and features of products directly to attendees.

Martha Brisk congratulates Michael Weiss with Complete Tree Service in Burlington, WI, another happy winner of $250 in Arborbucks.

Tim Gamma with Gamma Tree Service in St. Louis, MO, judges an entry in the Excellence in Arboriculture Awards program.
For many tree care companies these days, diversification is the name of the game. Owners tend to look at any possible line of work complementary to their main focus. The promise of diversification, if it works, is an increase of profits through the maximization of present resources, with only a relatively modest new investment.

Currently fitting in with this trend are arborists who are expanding their operations from tree removal and disposal of unwanted wood to the sale of that wood in forms other than mulch or chips. The reason, simply, is that arborists generate tons of wood in their normal pruning and removal operations, most of which is fed into a chipper and turned into chips. But with new laws prohibiting the land-filling of wood waste, many are having trouble or incurring considerable expense getting rid of the stuff. So, should arborists invest in a portable sawmill to turn their waste wood into saleable boards?

It turns out there is no single right or wrong answer to this question. The reason is that tree care companies differ so much in terms of size, location, types of wood cut, the markets for same, personal inclinations and so on. But here are the pros and cons of this topic, neatly divided into two separate sections. In each case there are observations from manufacturers of cutting equipment, followed by the personal experiences of an arborist.

On the plus side

On the positive side of the ledger, two manufacturers of portable sawmills are upbeat on the help these machines can offer to the tree care professional’s bottom line.
The first factor to consider is the local market for raw lumber, explains William G. Bailey, president of Bailey’s, a woodsmen supply company in Laytonville, Calif. He points out that many arborists don’t have large mills within their market area willing to pay for their wood waste. In rural areas, or even suburban regions with an active forestry industry within easy driving distance, small mills will accept and pay for logs. But as cities expand into the countryside, small logging operations are disappearing in many states. This leaves the disposal of wood in landfills, which is increasingly expensive, environmentally harmful, and, Bailey laments, “a disastrous waste of potentially valuable natural resources.”

Before investing in a portable mill, investigate milling outlets that currently exist. Find out what types of logs they will accept, how far away they are, and what price they will pay for different types of wood. You may even find someone who can call to come to a job site if you’re clearing a large enough number of trees.

Bailey adds that the smaller limbs should be chipped or cut and sold for firewood, but generally, cutting logs into firewood is labor intensive and yields the least net profit. A far better use is converting logs to furniture stock, gunstock blanks, lumber, cants, pallets, and other objects. The viability of an arborist’s milling business will depend somewhat upon the nature of the wood cut.

The best use of logs is, of course, a local market. But Bailey points out that if the market is further away, the lumber can be stored until there’s enough to ship to a distant location. Softwood lumber is commonly milled and sold immediately. But hardwood, the more valuable species, usually requires drying, either by air and time or by kiln.

Nora Loechel, public relations coordinator for Wood-Mizer Products in Indianapolis, Ind., explains that high-grade woods, such as cherry and Douglas fir on the West Coast, bring a good price. Red oak is very popular for furniture and trim. Poplar hardwood is a common species. Lower grade white oak is used for pallet manufacture, while pine tends to be more of a commodity, with prices ranging from low to relatively high among people who use it for basic furniture.

Bailey notes another plus favoring a portable mill—moving large logs requires heavy equipment but lumber produced by a sawmill is relatively easy to transport. Both Bailey and Loechel maintain that milling can be accomplished by one or two employees, who don’t need extensive training. They also note that the process is very safe, much safer than the use of a chain saw.

Both manufacturers also point out that milling can be positively incorporated into an arborist’s marketing, and, in fact, many are doing so. For instance, tree care companies that including removing waste wood in their bids can go a step further by offering the milled lumber to the customer as part of the deal.

“One arborist has the chance to address a reluctant client by addressing his environmental concerns,” says Loechel. She also says that the iron in urban trees can be a cause of concern, but the expense of sharpening or replacing a blade that costs $20 is a moderate one.

One arborist who is having a positive experience with his portable mill is Charley Pottorff, owner of Wildcat Tree Service, Manhattan, Kan. Pottorff, who’s been in the business for 40 years, paid $12,000 for his portable saw. “The reason we like it is that we do a lot of big tree removals,” he says. “If the tree is too big to load it out, we bring the mill to the log, take the timber or dimensional lumber right off the mill and load it onto the truck. We charge the customer who wants the logs and charge a dollar amount for cutting them up. Or, we recover the lumber, dry it, and resell it.”

Pottorff uses a full-sized pickup dedicated to the mill, which makes it very mobile. “If somebody wants to clear a pasture for farming, we can move the mill to his location and saw right there without the need to transport the logs, saving on big equipment and fuel costs.”

Pottorff reports getting $1.50 a board foot for green oak. “The mill is capable of quarter sawing, which is done very easily and is worth more than flat saw-

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“ing,” he relates. He adds that he gets about 50 to 60 cents per board foot for cottonwood, utilized as blocking for moving houses or as rough-cut lumber for paneling. He has a chipper that can handle an 18-inch log. His mill can saw 8-1/2 x 8-1/2 inch timber.

Pottorff sees his milling as a complement to, rather than a distraction from, his main business. “We’re in a position in which we do a lot of tree work, so we’re going to saw when need be, but we’re not tapering off from our tree work,” he insists. “It doesn’t require hiring or training anybody else. And it’s not such a big investment that we have to run it all the time. We run it when we have a need.”

Pottorff has had the machine since April, and, in that time, has had to provide very little in the way of maintenance outside of oil and grease. “As to whether it’s a money maker, I haven’t had it long enough to flat out say that it is,” says Pottorff. “But from all appearances, we’re going to do pretty good with it. What I like is the idea of recovering and utilizing the entire tree.”

Other factors to consider

Bob Storrier, president, U-CUT Enterprises, Inc. in Jamesville, N.Y., sells cutting tools, including the band saws used on portable mills. He has years of industry knowledge concerning the use of portable sawmills in the hands of those whose business is milling, including pallet manufacturers, arborists, hobbyists and others. “I’ve talked to numerous people who do get a good tree from them,” Storrier says, “but I think they serve mainly as a convenience for arborists to give them less product to dispose of. By the time they put it into a saleable item, I don’t believe it’s very economical for them.”

Greg Rusch, president of Rusch Equipment Company in Antigo, Wisc., observes that in his area most arborists take their waste wood to an established mill. The reason, he explains, is that “it’s more economical to let the big mills do it.”

Portable mills, which cost from $6,000 to $10,000, also incur on-going expenses for diesel fuel and blade replacement. Moreover, continues Rusch, waste wood as chips is usually carted away on a daily basis, but wood tends to pile up at the shop with a portable mill until there is enough to fire up the saw. Unless the tree care company manages a continuous flow of wood, there’s a tendency for the mill to be either over- or under-utilized. “You don’t want a piece of equipment going idle, but do arborists have that much extra man-power to keep the machine working?”

Custer Reed, store manager of the Plymouth, N.H.-based Hawkensen Equipment Company, Inc., also raises questions about the wisdom of tree care companies entering this market. Hawkensen is a retailer of chain saws, chippers, and other equipment to mills, loggers and arborists.

“The arborist is already in a business he knows well,” says Reed. “But by pur-chasing a portable sawmill, he’s stepping on another man’s bread and butter, someone who has more of a professional background in milling.”

Reed maintains that the arborist’s lack of experience in this area, together with the built-in limitations of a portable mill, means that he’s going to be inefficient. And, Reed adds, he will still be left with unwanted residue.

“A full-time mill will get a clean cut of wood it will turn into dimensional lumber, the chips will be used as paper products or fuel, and the bark will be mixed with other material to turn into mulch,” Reed says. Moreover, the “portable” aspect of this type mill is not as obvious as it seems. “It’s not likely you’re going to set it up in two different places for two trees,” he insists. “If you’re taking trees down, you’re probably going to move them to where the mill is, so it’s not going to be portable for every single tree. You almost need a small yard. And, if you take it on site where you’re taking down 40 trees, for example, it may be an open area where people don’t want sawdust on their lawns.”

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But perhaps the main drawback to entering this line of business, Reed maintains, is marketing. "Arborists will be spending more and more of their time trying to find markets for wood when they should be increasing sales where they have the most expertise. Arborists are better off taking wood to a mill and getting money up front, for they are not going to get the yield a logger or a sawmill will. Do they want to be arborists or mill operators doing arborist work on the side?"

One arborist who had an unprofitable experience with a portable sawmill is John Faucher, owner, T.L.C. Tree & Crane Service, North Gorton, N.H. "You might be able to get some finished lumber or firewood out of a portable sawmill, but it's very hard to make a profit," Faucher states. When Faucher first purchased his $5800 machine, he had in mind doing some specific projects, such as utilizing the lumber to build a garage. "The first thing I said to myself," he recalls, "is, wow, is this slow!"

When he purchased his portable mill, Faucher had a small company, which has now grown into medium-sized one. If he has generated 1000 feet of hemlock logs, he can run them to a mill and be paid 14 cents a board foot, or $140. For Faucher, it would take two men ten hours at $35 an hour, or $700, to do the equivalent. He is then left with the task of selling that lumber for at least $840 to make things even with the mill option.

"I've been doing this for 25 years," Faucher says, "and I've often noted arborists trying to diversify into areas such as landscaping and lawn care, but it takes less skill to do these jobs. A good climber can make $500 to $600 a day. It doesn't pay to have him raking leaves or watering lawns."

For Faucher, in a highly specialized field such as tree care, diversification can often mean diluting your expertise. Faucher stresses he is not against diversification, per se. He runs a large crane, which other tree services don't, and he rents it out for a variety of uses.

He acknowledges that, given the specifications of the trees cut—and the demand of the surrounding market—portable milling might be a viable option for arborists in different parts of the country. He is skeptical about success in his region, however.

"I've talked to a lot of arborists in my area, and the general consensus is that there are plenty of sawmills in New Hampshire. If you have a busy tree service, going into milling is not too practical."

**Due diligence**

Any tree care company considering buying a portable sawmill should know the answers to some important questions first.

- How much useable wood do present operations generate?
- What are current costs for wood disposal?
- Are there mills in the area that will accept and pay for uncut logs?
- Are there firewood producers that will accept and pay for uncut logs?
- What prices are they paying for different types of wood?
- Are there small saw operators in the area who will bring a portable mill onsite for those occasional large clearing jobs?
- Do markets exist for the cut logs you generate?
- What are cost/profit comparisons for chip disposal, raw log sales and cut logs sales?

Answers to these questions will go a long way toward determining whether a portable sawmill is a good investment for your company.
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Every year dozens of tornadoes, hurricanes and winter ice storms assault America's urban forest. The devastation and personal tragedy left in their wake can truly be humbling. For commercial tree care companies, nature's fury leaves special challenges—and opportunities—in its wake.

Companies at ground zero face a stream of urgent and not-so-urgent requests for bids and assistance. Oftentimes, the business must press on without valued employees, electricity or the types of office and maintenance assistance that is crucial even in the best of times.

Companies farther away from the center of the storm see the damage as an opportunity. Sometimes, business is slow in the winter, especially in the North. A select number of companies specialize in chasing storms, profiting handsomely from their expertise. When circumstances are right, storm-damage cleanup can produce a windfall. If crews are willing to put in 12-hour days away from home, the opportunity exists to generate a great deal of money in a short amount of time.

But opportunity is not a guarantee. The logistics of working away from the support facilities of home and office present special challenges. Storm-damage work is difficult and can be emotionally wrenching. And the process of getting paid for work completed is completely different for those who are used to local pruning and removal jobs that are quickly followed by a check from the homeowner.

The National Arborist Association recently created a database of member companies willing to travel or to accept out-of-town crews in the event of a storm. In addition to volunteers, we received a flood of advice and warnings on the perils and pitfalls of storm cleanup. What follows are the shared experiences of storm veterans.

Factors to consider

Adrian Juttner, owner of Adrian's Tree Service in New Orleans, La., tried mobilizing crews for storm-damage work, but his results were not encouraging. When a hurricane hit Mobile, Ala., he put a crew together and hit the road. One of his employees had family members in Mobile, so they had a place to stay. Their plan was to start by trimming the family member's trees, interest neighbors and work outward from there.

"We found we had no credibility," Juttner recalls. "We ended up knocking on doors asking if we could do tree work. People looked at us as if we were a bunch of thieves. We couldn't generate any business. The potential was there—tree work was needed everywhere—but no one would hire us. Next, we tried to run an ad for our services, but the newspaper wouldn't take it. They felt we were a bunch of out-of-state profiteers. We just couldn't get our foot in the door. We ended up driving home, leaving millions of dollars in tree work on the ground."

The next time out, Juttner tried a different tactic. When a hurricane hit Houston, he flew in by himself to see if he could drum up some business before he called in crews from Louisiana. He found that the competition was too intense.

"People doing tree work had hundreds of unskilled laborers. They weren't charging enough to make it worthwhile. I learned some hard lessons: just because you can see tree work that needs to be done doesn't mean you can land the job or make money."

The last time Juttner actively sought out-of-town tree work was after a hurricane hit Baton Rouge, a short drive from his home base in New Orleans. "I bid a lot of tree work over there, and we didn't get any of it," he explains. "I thought I was putting in reasonable prices. Tree companies were coming in from all over the country. The scuttlebutt was that they ended up bidding jobs too low, and many of them got stiffed on payment. If you are from out of state, how do you make sure you get paid? Are you going to come back to take them to court? Some of them didn't have enough gas money to get home," Juttner notes with a chuckle.

"If an arborist is an NAA member, I don't care where he comes from; I trust him," he says firmly. "I would have no problem working with him doing storm cleanup. But we will both have a problem getting paid by homeowners."

Even locally, Juttner doesn't jump at the chance to bid storm work any more. At one time storm work kept him busy, and he developed good working relationships with insurance adjusters in the area. Trust developed that he wasn't taking advantage on his bids and work was steered his way.

Then the insurance companies changed all the rules. Any bid over $500 wouldn't go through.

"We could put a bid in for emergency services, and they would seek three other estimates," relates Juttner. "In my mind, that's no longer emergency work."

As a result, Juttner's insurance business has dropped to al-
most nothing. "After a storm, I have regular customers who call. I don't need to run around for an insurance company, pricing jobs that will go to the lowest bidder," he insists. "I tell them that since there are no more emergency jobs, my consultant's fee is $65...and I want to be paid in advance. That pretty much cuts me out of the market, which is fine."

While Juttner has established a solid reputation in the area with regular clients, those aren't the people who call for storm-damage work. To them, his hard-earned reputation means nothing.

"We are somewhere between trash picker and a drug addict in people's minds," Juttner complains. "It's a constant battle to get paid. Regular customers, who know what tree work costs, know what the fees are. After a storm, people who have never hired an arborist need tree work. They haven't a clue about price. They demand instant service. I'm telling you, that business is not worth having at all. I end up referring thousands of dollars worth of business to competitors."

"It's sad," Juttner concludes. "This should be a big business opportunity. I don't think anybody could hold out enough money for me to travel to North Carolina. I can make more money working with regular customers right here. I wish I could be more positive."

While Juttner won't travel to bid storm work, in hurricane alley along the Carolina coast opinions are much the same. Paul Mulkey, owner of The Tree Clinic in Charleston, S.C., will only service existing clients—and then only on large properties such as golf courses or estates.

"There really isn't money to be made travelling long distances," Mulkey says. "You lose a day packing up your gear, you lose a day getting to the job, and you lose a day coming home. All of a sudden you have a lot of ground to make up. The only way you can make money off of a storm is if you already have a contact and you factor in all the added costs. And you still might not make money. There are a lot of surprises you might not consider."

"I take what we normally bill per hour and add higher taxes, hotels, fuel, meals and added downtime," Mulkey explains. "Downtime is always higher out of town because it's harder to get repairs or replacement parts. The local parts place wants a check, since you don't have an account. UPS might not be able to deliver in a disaster area. Gas prices are higher. You also might not have a place to dump wood. And crews don't know the fastest way to get around."

In addition to logistical concerns, Mulkey has learned that companies pricing jobs throw basic business principles to the wind. "When you get to a town, it's like a fever," he says. "On the first day, crews show up but the evacuees aren't back in town yet. Right away, tree companies are desperate. There's plenty of work, but they can't get any of it. Then, the news media will scare people about gouging. By the third day, people are so sick of tree companies knocking on their doors that every tree guy is a bum. By day five, they are giving work away just trying to get out of town. Every time, absolutely, the bottom falls out on day five."

Mulkey has experienced some of the same distrust of out-of-state firms that thwarted Juttner. "Instantly, you have no credibility, your references have no value and you are the low company on the totem pole," says Mulkey. "Sometimes, the guy with a pickup and a local number has more credibility. We will not go to a community to work in people's backyards."

Interestingly, Mulkey learned the hard
way that local companies have another advantage: they will steal employees to do all the work they landed. “Any time you are in a storm situation, your crews will be approached by other companies,” he cautions. “Local tree companies are only limited by the number of people they have working. Our guys were at a gas station and the local owner pulled up and offered them $70 an hour to come to work for him. Two months later they might not have any business, but people think short term.”

Mulkey lost employees a few years back to this sort of instant recruitment. Now, he typically doles out “hazard” pay, which is double his normal rate, to avoid losing people. Of course, a premium for employees adds costs and cuts into his bottom line.

“The only people who make money from a storm are the climbers,” Mulkey says. “They can head off with a chain saw in their pickup and make $1,000 in a day.”

These sorts of difficulties have convinced Mulkey not to travel blind to storm centers. His business does have contracts over a large geographic area, so The Tree Clinic crews will be found away from their home base after a storm—but only to service existing clients, such as golf courses, with significant amounts of work to be done. Mulkey would much rather work on developing steady clients in his area to travelling in the hopes of making large profits in the short term.

“When you leave, you leave work in town,” he points out. “We hope all our competitors go, so that people in town can’t find anyone else. We can pick up long-term customers when everyone is gone. We can also be a little more aggressive on pricing when we know there’s nobody left in town to work.”

Another storm veteran is Mike Zimmerman, president of Zimmerman Tree Service in Lake Worth, Fla. Zimmerman has traveled to hard-hit areas and called in crews from outside. Visiting crews worked under Zimmerman’s license, becoming, in effect, his crews.

“If you are going to bring crews in to work for you, documentation is critical,” Zimmerman explains. “Do they have insurance? Who is going to pay for which costs? What is the crew going to work for? Who is the supervisor? Who is in charge? What kind of work do they know how to do? How self-sufficient are they? What’s this crew really going to cost me when it gets here? Will they come to me because the chipper doesn’t work and the climbers don’t have ropes. Will the trucks have bald tires? Is the crew going to be an asset to the business or a liability? You don’t want to talk about all this when they arrive.”

Zimmerman solved most questions by working out the details beforehand. He submitted bids to government agencies before hurricane season, and he had extensive negotiations with the tree care company that would mobilize from out of state. “We worked with a government en-
tity that paid for travel and expenses in getting here. Our client paid the expense of mobilization, housing, meals and fuel. I don’t know what individual crew members were getting. We negotiated a price per crew, added a markup, and billed the entity. And, yes, the price was higher than our normal rates.”

While things worked out in that instance, Zimmerman does not encourage companies to head into his area. When Hurricane Andrew hit, he got a slew of calls from as far away as New York. “People would call and say that it would probably cost $5,000 to mobilize and come down,” he says. “I told them I couldn’t guarantee anything. If they chose to come down, we might be able to work something out ... but don’t make me responsible for your relocation or for finding you work. We told people that if they didn’t have any work locally, they might be better off taking the $10,000 it would cost to get down here and spending it on some advertising.”

After Hurricane Irene, Zimmerman’s office was flooded with phone calls. His best estimate is that 90 to 95 percent were not regular customers. He turned what could have been a frantic period into a business success. “We got a lot of new clients,” he says. “We didn’t handle all the calls as well as I would have liked, but we handled what we could. The first three days we had 400 calls. For a month afterward we got 150 to 200 calls a week.”

Zimmerman has had no trouble getting paid for storm cleanup work. For the most part, he bypasses insurance companies, dealing directly with the client. He makes it clear he can’t be responsible to talk to the insurers—or wait for the insurance company to pay.

“When Irene hit here, we only got a little wind, but we had two weeks of rain,” he says. “The insurance companies have taken a pretty hard line on winds and floods. They will pay to take the tree off the house ... but nothing else.

“Our proposal states that we expect payment within a certain number of days,” says Zimmerman. “Don’t tell us your are waiting for the money from the insurance company, your great uncle or your mother. Our job is to do the work, make you happy and get paid.”

Gary Mullane, owner of Low Country Tree Care in Hilton Head Island, S.C., is one experienced arborist who sees profits in travel—if done right. Mullane took 15 employees down to Florida to work with Zimmerman after Hurricane Andrew.

“Before we got there we had a contract in hand with a government entity,” says Mullane. “I wouldn’t have gone without that. We added in a mobilization cost of $24,000 for the first week, which was reduced for each week we worked. So, no matter what happened, we would be covered for our mobilization costs.

“You need a place to go or a contract for work under,” advises Mullane. “Otherwise, by the time you leave your gates, it will cost $1,000 a day to stay on the road ... with no guarantees for work. Also, after a couple of days, crews want to go home. If you pay people the regular amount, they would rather work at home. If you pay them more, then you have to charge more, which is hard because the market disintegrates. Then everybody is fighting for jobs to get enough money to go home.”

Though Mullane won’t travel without a guaranteed contract, he sees others who chase storms for fun and profit. In this age of specialization, these firms have found a niche in storm cleanup by developing answers for all the cost variables and pricing uncertainties mentioned above. A few, laments Mullane, profit by inflating prices and gouging clients. “Some people can
make money at it," he admits. "They feast on storms. They are used to operating a nomadic company, chasing hurricanes. If you are not experienced, however, you can get burned."

Larger firms, such as The Davey Tree Expert Company, can overcome many of the hurdles of residential cleanup work by utilizing the resources and local knowledge and affiliated offices. When Davey crews travel, they don’t worry about finding repair facilities, spare parts, chip dumping sites or any of the other logistical headaches involved in working in a strange town. Davey also has the advantage of size, which allows them to bid on larger jobs with a more stable price per hour.

Even for Davey, however, the market price for jobs is crucial. Keith Francies, district manager at Davey’s Greensboro, N.C., office, helps mobilize crews from around the state for non-utility work after storms. It’s fairly common for Davey crews to travel, according to Francies, “depending on the rate we can get. If you can’t get the rate that you need to pay for travel and time, hotels, fuel, etc., then there’s not much point in people going.”

“Everything in the South tends to be billed at a lower rate, so people headed in from the North will notice a difference,” cautions Francies.

To make the same amount of money, Francies figures a 20 percent to 30 percent premium to pay for added expenses. “We generally don’t increase rates for local crews to be fair to our clients. Even if we have added costs for overtime or a generator when the electricity is out, we try to recover that from work done on properties that aren’t regular clients. That increase wouldn’t be much, maybe 10 percent.”

At Davey, out-of-town crews generally work on specific, long-term projects while local crews service existing customers. “What’s worked the best for outside crews is university or DOT work. Those jobs will set up crews for two or three weeks,” says Francies.

Two weeks worth of work is probably the minimum needed for a crew to travel,” notes Francies. “We usually know when a storm is coming, so we fuel up, replace bars and have a safety meeting to refresh everyone’s memory. Just getting organized will cut efficiency for the first day or two.”

The type of work assigned will depend on who comes in. “A good crew, overseen by a good foreman, is crucial,” insists Francies. “When you are dealing with steady, residential clients, you don’t want a crew that’s a little rough around the edges. Customers might think that outside crews won’t care as much about the property because they won’t see it again.”

Conclusion

Chasing storms can be financially dangerous for a tree care company, just as a hurricane is structurally dangerous for a tree. Some profit, others are lucky to return with all their employees and the trucks half filled with fuel. The best advice is to know your costs cold and try to work out arrangements with governments or local companies before disaster strikes. Otherwise, you might find yourself sitting in a damp motel room, far from home, wondering how many of your regular customers are giving the competition a try.

Mark Garvin is editor of TCI magazine.
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Candid comments from our readers ...

Some People Unsuitable for Comment

Recently, *TCI* published a letter from Dick Kutscher (Nov. '99) to “us forestry people” who are so “… overly impressed by wind-caused motion.” Kutscher is currently in a nasty feud with his neighbor about a tree they had cabled by a very competent tree service. Your writer wants the tree removed due to personal paranoia, and anything short of that is unacceptable. After obtaining a copy of our instructions for installing Cobra and several hours of peering out his back-door window, the engineer became an expert on tree cabling. He had no conversation with the manufacturer of Cobra and no formal study of cabling through ISA, just his armchair study of the literature backed by his dusty degree. During the past six months Kutscher has found the time to write just about everybody in the northern 48 (no kidding, I have copies of over 52 letters to date). He is determined to fell this large majestic oak a few hundred years his senior.

Every tree service has had to deal with an “out of the woodwork know-it-all” at some point in time, but few will ever match Richard H. Kutscher, P.E.

Regardless of the misguided messenger, let me clarify a few things about the industry and Cobra. (See TCI, Nov. 1999, page 69 to follow along):

A. At 20,000+ companies strong, most of us prefer to be addressed, as the magazine implies, as Tree Care “people.” Foresters are the guys who harvest lumber and pulpwod from “the forests.” No big deal, we get that a lot from OSHA.

B. The splice in synthetic rope is designed to remain fast even with “wind-caused rope tension.” When Cobra is spliced correctly, snug around the target limb, there exists enough tension at the splice junction to forbid slippage. Splices work, and work quite well, regardless of Kutscher’s “beliefs.” Otherwise, the planet would be inundated by ships that breech the thought of their freshly placed steel systems being ripped and thrashed by high winds. Ask a Cobra user what he’ll be thinking about during the next storm and watch his shoulders soften as he gazes off into the distance and softly utters “…buzzing, buzzing, buzzing.”

C. Rope can’t tell the difference in tension caused by “growth increases in circumferences of the limb” and “splitting … the faulted portions.” (The man is right on this point!) However, the product is not spliced around the cracked portion of a tree but around the limbs above the crack.

D. Cobra design does not rely on wind-caused tension to loosen the rope and protect the cambium; it uses “growth increases in circumference of the limb” (see C). Cobra’s manufacturer is interested in obtaining a copy of our instructions for tree removed due to personal paranoia, and any thing short of that is unacceptable. His primary complaints remain that one cable was “mistakenly installed parallel to another,” and cable was “mistakenly installed below the crown of the tree” and “mistakenly not equipped with a shock absorber.” All these methods are acceptable techniques for Cobra.

E. When a crack or evidence thereof exists, it is often necessary to install bracing to effect proper healing of the target crotch. No cable, be it steel or Cobra alone, can “restore a dangerously split tree to a sound condition.” These are circumstances that make an arborist the expert.

F. Kutscher recently mailed an invoice to me, the city forester and the tree service involved for “services we did not realize we needed until they were rendered.” I’m saving up to pay that one! As for wind-caused motion, Kutscher appears to have cornered the market … and that, my friends, is indeed “overly impressive.”

There are those who believe that steel cable (in conjunction with bracing) is best suited for cracked trees because the situation calls for a “static solution” to an injured portion having little chance of future self support. Although Cobra has been used a great deal in conjunction with bracing, there are probably as many different circumstances as there are cabling jobs. Cobra, with its shock absorber installed, was designed, without question, to stretch and recover repeatedly, keeping the tree from reaching “the danger zone” in high winds and ice. Most arborists tense up at the thought of their freshly placed steel systems being ripped and thrashed by high winds. Ask a Cobra user what he’ll be thinking about during the next storm and watch his shoulders soften as he gazes off into the distance and softly utters “…buzzing, buzzing, buzzing.”

Cobra Continued …

Concerning the letter to the editor from Richard H. Kutscher, P.E. in the November ’99 issue of *TCI* about Cobra Rope System: I too have been apprehensive about any new product untested by the final judge—time.

In fairness, however, I am still interested in this new system of branch support, since standard alternatives have their drawbacks. Cobra Rope System attracts my attention by its claims of having a serviceable shock-absorbing feature, as well as the fact that it does not wound the tree in its installation. This may be a better choice for some trees with narrow crotches that are not split.

I understand Kutscher’s concern if this system was installed into a tree that had an evident split, and if that split was not braced in some other fashion, such as with a threaded rod. Although notably split trees may be better served with rod and cable (wire rope), I believe there may be benefit in allowing as much natural movement in tree branches as possible to help strengthen the branches and dissipate the wind’s force. Cable is restrictive to branch movement, except above the cable’s attachments. Apparently, Cobra Rope is not as restrictive to branch movement and may be a better choice for some malformed branches.

I do not believe any bracing method, be it cable, threaded rod, prop, Cobra Rope, etc., will make a mature split tree “sound” again. If a mature tree is salvageable after developing a split, it will need mechanical support of some form throughout its remaining life. Regardless of the method used (or the reason for that use), all support systems need to be inspected regularly. The regular inspection of these supports, including Cobra, should determine their viability with respect to the tree’s growth, girth and other factors.

Bob Johnson
Chatsworth, California

Content Matters

I read a number of trade publications in various industries, including the arboricultural, horticultural, energy, design and computer fields. *Tree Care Industry* is consistently one of the best in terms of content. Far too many trade journals are
merely advertising vehicles with a little bit of weak editorial filler to provide an excuse for the advertising. *Tree Care Industry*, by contrast, consistently has high-quality, useful articles. Please keep up the excellent work!

*Chris O'Brien*
Howard Garden Designs, Inc.
Newton, MA

The Law Revisited

Regarding your article by Lew Bloch on consulting and testifying as an expert witness in November '99 issue...

You are apparently unaware of one huge point in regard to tree litigation. To wit, the location of the trunk does not define ownership.

Stepping a distance back and looking at the tree you will see (1) a crown—possibly spanning two properties and (2) a root system (with your X-ray vision)—possibly spanning two properties. With two properties involved, the two property owners are joint owners of the tree. The concept of encroachment of the top of a tree over another's property is an archaic twisting of real estate law.

In court with knowledgeable lawyers, the judge will not cut the horse in half and give each their piece. The result is that the chop-happy party loses. If the tree is serviced without the second owner's consent, they would be liable for the act in itself.

*Paul Carlin*
State of Illinois Licensed Tree Expert
Tiny Tim Tree Service, Inc.

Lew Bloch responds...

It is important to know that I am not an attorney, just a mere Registered Consulting Arborist. However, I have had some experience with tree law in my career and have recently completed a book on tree law cases in the United States to be published early next year by the ISA.

It is my understanding from attending seminars, reading Victor Merullo's *Arboriculture and the Law* book and from researching cases for my book that the major criteria for tree ownership is whether the property line goes through the tree trunk. Where the roots or branches extend is not relevant to tree ownership. Mr. Carlin states that limbs and roots may extend over two properties. I know of trees where the roots and/or branches may extend over six or more properties, but this does not constitute tree ownership.

There may be extenuating circumstances to the above, such as a tree that is wholly on one property, but both parties have been jointly caring for the tree. Also, there may be a tree on one property, but both neighbors shared in the cost of planting the tree.

I do agree with Mr. Carlin that the law does protect the tree and does not allow either party to service the tree without the other's permission. Again, I am not a lawyer, and I suggest that if someone wants a definitive answer, or has questions about the law, they retain an attorney.

*Lew Bloch*
Registered Consulting Arborist
Potomac, Md.

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95-3162 1989 Chevrolet C70 diesel chassis, manual 5/2 transmission, air brakes, with an Altec AN650 (0589-V0273) 56' working height, two man end hung platform, over rear axle with full line body. $37,500 or about $980/month w.a.c.

95-3839 1987 Ford F800 diesel chassis, manual transmission, air brakes, with an Altec AM600 (0887-R0614) 55' working height overcenter aerial, single rotating platform, with a flatbed body and thru compartments. Aerial has been refurbished and is RTW. $38,000 or about $980/month w.a.c.

95-3895 1987 Chevrolet C70 diesel chassis, manual transmission, air brakes, with an Altec AM600(1087-R0649) 55' working height overcenter aerial, single rotating platform, with a flatbed body. Aerial has been refurbished and is RTW. This was the TCI show truck. $39,500 or about 1,000/month w.a.c.

95-3804 1989 IH diesel chassis, engine just rebuilt, manual transmission, hydraulic brakes, with a Hi Ranger 5HA-55 (078814881) 60' working height aerial, two man platform, and fiberglass full line body. $48,500 or about $1,260/month w.a.c.

95-4058 1991 GMC Topkick diesel chassis, AT, AB, with a Hi Ranger 5HA-55(0191171481) 60' working height aerial, single man platform, flatbed body with thru box. $53,900 or about $1,110/month w.a.c.

95-4072 1994 Ford F700 diesel chassis, AT, AB, with an Altec AN755 (1099-U1164) 60' working height aerial, two man platform, new flatbed body. Aerial has been refurbished and is RTW. Unit is frost law legal. $52,000 or about $1,293/month w.a.c.

Just arrived!! 1999 International diesel chassis, 9,000 miles, hydraulic brakes, manual transmission, with an Altec LRIII-55 60' working height overcenter aerial, full chip dump box with thru boxes. Unit is ready for immediate delivery. $76,000 or about $1,339/month w.a.c.

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... continued on page 62
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70' w. Hi-Ranger 6H-65 a 1994 Ford F700, 5 speed, 54,768 miles, rear-mount flatbed.

60' w. LRIII Asplundh on a 1992 GMC Topkick, 3116 Cat diesel, 34,852 miles, 6 speed, air brakes.

55' w. LR50 Asplundh on a 1990 Ford F700, 5 speed, 54,768 miles, rear-mount flatbed.


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- Must LOVE to climb
- Must have current CDL
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Unique Opportunity in No. VA. Ground floor tree care operation seeking climber/foreman. Applicant will have 5+ years experience in takedowns, crane removals, ANSI A-300 pruning standards, drop crotch pruning, installing lightning protection systems and cabling and bracing. Certification required after 1 year. Successful candidate will own % of company after satisfactory 1 year work history. Call John @ (703) 978-6977 or send resume to Twinbrook Tree Care, 9534 Braddock Rd., Fairfax, VA 22032-2504.


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TREEme City - FOREM AN Well-regarded, long established tree care company in the beautiful suburbs of Philadelphia seeks exp. climbers for fine tree care. Minimum starting salary for top climbers $30,000. Also will train potential top climbers. Benefits include 100% paid medical, fully paid pension plan, 6 1/2 holidays, 2 weeks vacation. Will help re-locate.

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Chemical Sales Representative - Come join one of the largest Vegetation Management Companies in the United States. DeAngelo Brothers, Inc. has immediate openings for Chemical Sales Representatives throughout the U.S. Responsibilities include direct marketing of DBI's full product line of chemicals and related equipment throughout a regional territory. Horticulture or related degree desired, with a working knowledge of Vegetation Management Chemicals. (Minimum two years experience.) Qualified applicants must have strong interpersonal communication skills. The candidate chosen will work out of a DBI Regional Office and must enjoy travel. We offer an excellent salary and benefits package, including 401(k) and company-paid medical coverage. For confidential consideration, please forward resume, including salary history and geographic preference in cover letter. Send or fax resume to: DeAngelo Bros., Inc. Attn: Charlie Sizer, 100 N. Conahan Dr., Hazleton, PA 18201. Fax: 570-459-5500. EOE/AAP/M-F

FOR SALE

USED EQUIPMENT FROM BANDIT INDUSTRIES, INC.

Brush Bandit Chippers
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Bandit Whole Tree Chippers
(1) Model 1200, Cummins 177 hp; (3) Model 1254, Cummins 200 hp; (2) Model 1290 Drum, John Deere 80 hp; (1) Model 1400, Cummins 200 hp; (2) Model 1400 Track, Cummins 200 hp; (1) Model 1690, Ford 119 hp; (1) Model 1690, Ford 6 cylinder; (1) Model 1850 Track, Cummins 250 hp; (1) Model 1900, CAT 3406TA 425 hp

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Vermeer
(2) Model 1250; (1) Tub, 3406E CAT 400 hp

Miscellaneous
(1) Chipmore; (1) Promark, Kohler 23 hp; (1) Duratech Whirwind, CAT 3056; (3) Asplundh 12-inch drum, Ford 6 cylinder, Perkins 80 hp; (3) Asplundh 16-inch drum, Ford 6 cylinder gas, Ford V-8; (1) Wayne drum, Chrysler 6 cylinder; (1) Willibald M2A-2500S; (6) Mitts & Merrill, 6 cylinder gas; (1) Trelan M-18, Deutz diesel; (1) Innovator 8-foot tub, Cummins 6BTA diesel, 177 hp; (1) Jenz Wastewood grinder; (2) Rayco Stump Grinder RGG635A, Wisconsin 35 hp

Bandit Industries, Inc., 6750 Millbrook Road, Remus, MI 49340. Phone: (800) 952-0178 or (517) 561-2270. Fax: (517) 561-2375

... continued on page 64
Ford F-600 1989 Spray Truck, auto with 1,000 gallon bean 60 gpm sprayer (lots of extras) Works Great! $12,500. Two 1,000 gallon Bean Sprayers 35 hp Wisconsin engine. Everything needed to make you a $1000 a day! $2500 each. Kev's Tree Service (516) 942-TREE (8733)


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1-Bandit Model 150 chipper, reconditioned, 4 cyl. Ford, $12,900.
1-Bandit Model 200-xp 173 hrs. diesel, $17,500.
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1-Bandit Model 250-xp 68 hrs. 6 cyl. Ford, $21,000.
1-Bandit Model 250-xp 521 hrs. diesel, $18,500.
1-Bandit Model 250-xp 1050 hrs. diesel, $17,500.
1-Bandit Model 250 reconditioned, $18,500.
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1-Rayco 1665 200 hrs., $12,500.

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  - 1995 Chevy 3500 HD 10-ft dump, 454 5-speed, 37000 miles, $20,000. Call 802-436-2033

... continued on page 66
BUSINESSES FOR SALE

Very profitable full service tree care business in a thriving N.E. Indiana resort area. Well established - 12 years - this company dominates the market in this area. Well-trained crew, continuous 2-3 month backlog, includes all equipment for turnkey operation. A steal @ $98,500. Retiring: Contact Evan R. Rice © Rice Tree Service, Inc., 1-219-495-5021 evenings or weekends.

Tree Care Business For Sale: Established and profitable business located in Maui, Hawaii. Year-round work with opportunity for growth. Excellent reputation. Incl. truck, chipper and misc. equipment. For info, call (808) 871-4701.

Well Established Tree Care Business For Sale - Excellent reputation and great growth potential. 13 years in Naples, Florida. $125,000. Retiring - call 941-353-1005

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8. Bodies: Mounted, Undercoated, Chemically Degreased, Coal Tar Epoxy Coating inside Chip Box, Primed and Painted
9. Stainless Steel Hinge Pins with Grease Zerks
10. Weatherproofed Tool Boxes
11. Chipper Air Exhaust Vents

B. Overall Body Dimensions:
- Length: 168"
- Height: 72" (Inside)
- Width: 92"

C. Chip Box Material: (Galvannealed)
1. Floor: 10-ga. plate
2. Sides & Front: 12-ga. plate
3. Top: 14-ga. plate
4. Tailgate: 12-ga. plate with tubing frame (270° swing)
5. Runners: 8" structural channel
6. Cross Members: 3" structural channel
7. Rear Vertical Support: formed 1/4" plate
8. Rear Horizontal Support: 4" x 4" x 1/4" square tubing

D. Tool Boxes: (14-ga. Galvannealed)
1. Underbody Tool Boxes:
   - (two) 48" long x 20" high x 20" deep
2. "L" Cross Box:
   - 24" long x 92" wide x 26" high across chassis rails
   - Door: 24" long x 48" high; six rope hooks, stationary shelf and water cooler holder
3. Ladder Box: (inside chip box)
   - 143" long x 17" wide x 27" high
4. Pruner Box: (inside chip box)
   - 168" long x 17" wide x 12" high
5. Locks:
   - Slam, keyed with hidden theft resistant rods

E. Optional
1. Tool boxes and Step-Type Rear Bumper
   - Behind rear axle 34" long x 20" high x 20" deep
2. Cab Protector
3. Top Ladder Rack with Access Steps
4. Electric Trailer Brake Control
5. Wheel Chocks and Holder

NOTE: Chassis Cabs Available to complete the package 102" CA Chassis Cab required.
Three measurement sites were chosen on the trunk of each tree, between two and six feet above the ground.

A 2.5-inch x 4.5-inch template was used to mark evenly spaced test sites for two Resistograph and four drill measurements.

Outside my bedroom, the wind howled like a wounded animal. Lightning flashed repeatedly in dazzling amber streaks, illuminating the room like X-rays penetrating a heavy curtain. Driving rain beat a staccato rhythm on the roof, as deep bass rumblings of thunder shook the walls and bed. Sleep was impossible.

My crew was already exhausted from two weeks of fighting the “hundred year” storm. There were floods in the lowlands, landslides in the mountains, and downed trees everywhere. Our job was to help keep the roads open. It’s what tree crews from California Department of Transportation (Caltrans) do.

Drifting into a fitful slumber, I once again slogged through knee-deep mud, scaled crumbling cliffs and felled 100-foot redwoods before they fell, on their own, to the roadway 300 feet below.

The distant, persistent beeping from my pager pulled me slowly to consciousness again. Rolling over, I dialed our dispatcher. “John, we have a police report of three big trees down in Burlingame, on the El Camino Real. They fell on some cars, and a little girl is trapped inside!”

As I arrived, our crews were lifting a huge, uprooted tree off the car with a small crane. We held our breath as the fireman inched inside the ruined car. He emerged with the little girl cradled in his arms ... alive. It was a miracle! Her father broke into tears. No one present will ever forget that day.

Each year, many innocent people are not as lucky as this little girl. Instead, they are
The Resistograph measures the resistance encountered by a 3-mm (.12 inch) diameter drilling needle as it mechanically advances into the tree.

Drill evaluations were recorded as: bark, sound wood, potential decay, decay and cavity.

Injured or killed by falling trees. Property is damaged and lawsuits abound. Sometimes sound trees fail in a storm as an “act of God.” However, trees can also fail because trunks and root systems have become unsound due to fungal rot.

This time, the failed trees were 100-year-old Eucalyptus globulus and viminalis. They uprooted because of roots ruined by a brown rot fungus, Laetiporus sulphureus, more popularly known as sulfur shelf mushroom.

Older trees in newer urban areas are particularly susceptible to rot because the roots are often damaged by construction as the city grows up around the trees. Often the condition is hidden. Roots rot so slowly that affected trees have plenty of time to grow smaller “feeder” roots. The smaller roots provide moisture and nutrients, but offer little support to the tree. Trunks may have hollow cores, too, which are invisible from the outside to the naked eye. These hidden hazard trees are accidents waiting to happen. Killer trees are a tree manager’s nightmare and a danger to the unsuspecting!

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Tree Tech® Environmentally Sound Tree Health for the '90s and beyond.
The study

During the month of August 1997, I initiated a study to test and evaluate trees from the inside. A new decay detection tool from Germany, the Resistograph, seemed promising. We put it to the test.

The study I initiated was a joint effort paid for by Caltrans and the City of Burlingame. The University of California was commissioned to assist in the study. We evaluated the accuracy and reliability of a drilling technique and the Resistograph.

The drilling technique has been used for years by arborists to detect internal decay. A cordless 3/8-inch drill, with a 1/8-inch x 12-inch brad point tip bit is used. As the tree is drilled, the resistance encountered gives an indication of wood soundness. The bit is pulled out at 1 centimeter (.4 inch) intervals, and the wood shavings are evaluated for integrity, color and smell.

The Resistograph, developed by Dr. Claus Mattheck, measures the resistance encountered by a 3-mm (.12 inch) diameter drilling needle as it mechanically advances into the tree. Wood hardness (resistance) is recorded by a stylus on a wax paper graph. Hardness is an indicator of wood soundness. Sound wood is hard, decayed wood is soft. Decay shows up as a drop in the measuring curve on the graph. The graphs also show annual rings, reaction wood, cracks, cavities and other defects. This information can be downloaded and evaluated. Instrument Mechanic Labor, Inc. (IML) manufactures and distributes several models of the Resistograph in the United States. We used the M-300 model in the study.

Twenty-one trees that had to be removed for safety reasons were selected for measurements. Sixteen were Eucalyptus globulus Labill (Tasmanian blue gums), and five were Ulmus glabra Huds. (Scotch elms). The trees were 75 to 150 years old, and ranged in condition from sound to highly decayed. Three measurement sites were chosen on the trunk of each tree, between two and six feet above the ground. A 2.5-inch x 4.5-inch template was used to mark evenly spaced test sites for two Resistograph and four drill measurements. Two drill operators had considerable experience, and the two others received basic training. Drill measurements were made independently, so operators would not influence each another. Drill evaluations were made at every centimeter (.4 inch), and transposed onto charts scaled like the Resistograph wax paper graphs. Drill evaluations were recorded as: bark, sound wood, potential decay, decay and cavity. There were 18 measurement sites per tree, for a total of 378 Resistograph and drill tests.
After all Resistograph and drill measurements were made, the 16 eucalyptus and five elms were removed. Many of the blue gum eucalyptus were over five feet in diameter, and considerably taller than 100 feet. A large crane and “whole tree chipper” were utilized by Caltrans’ private contractor, Expert Tree Service, to facilitate the removals. The Burlingame tree crew removed trees owned by the City of Burlingame. The three marked trunk sections where the tests were made were cut out, wrapped in plastic and transported to the University of California Forest Products Lab in Richmond, Calif.

Results

The wood condition of each wafer, from the bark inward, was determined and recorded on charts. Finally, the Resistograph and drill field charts were compared to the laboratory wood condition/density charts.

Resistograph: An average of 86 percent of field Resistograph readings were in agreement with laboratory density measurements for bluegums. The figure was 100 percent for elms. In cases of poor agreement, the Resistograph indicated decay was not present while density readings showed decay. In most cases, this was when density values were declining slowly from .65 g/cm³ to below .5 g/cm³. Density assessments indicated early or intermediate stages of decay, while the Resistograph did not show changes in wood resistance. The Resistograph accurately identified all trees having sound wood only. Termite galleries in bluegums caused reductions in field-resistance readings, which were initially interpreted as decay. No significant variations were found between the two Resistograph units used in the study. When combining both species, the Resistograph achieved an average of 93 percent accuracy.

Drill-test: An average of 73 percent
of field drill-test measurements were in agreement with laboratory density assessments for bluegums. The figure was 81 percent for elms. There was considerable variation in accuracy/agreement among drill operators. A range of 56 percent to 83 percent agreement existed for bluegums, and 72 percent to 86 percent for elms. Familiarity with the tree species and experience proved to be the key elements associated with reliable drill-test evaluations.

**Practical advice**

The Resistograph must be calibrated for the tree being tested, which is a two-step process. First, determine if the Resistograph is operating properly. A block of wood with a known resistance pattern should be tested. Milled or dried wood of the same species or another species of similar density to the tree being tested can be used. Standard wood density charts can help you choose.

Next, become familiar with sound-wood profiles for the tree species being tested. This can be done using recently cut sections from trees of the same species, ideally growing under the same conditions. Resistance patterns for sapwood, heartwood and reaction wood must be understood before the instrument is used for decay assessments. The operator needs to know what the reading for a normal, healthy tree looks like!

Experience with the tree species being tested is vital for accuracy when using the drill-test method. Operator variability in assessing trees, which were free of decay in our study, suggests that some operators may think a sound tree is decayed. Unnecessary tree removals could result! Suggestion: Drilling in assessing trees, which were free of decay in our study, suggests that some operators may think a sound tree is decayed. Unnecessary tree removals could result! Suggestion: Drilling depth can be measured by placing a foam earplug on the drill bit. As the bit moves into the wood, the earplug is moved a distance equivalent to the depth of the bit tip.

**Summary**

Resistograph charts reliably show where sound wood ends and advanced decay begins. However, neither the Resistograph nor the drill method are useful for detecting early or intermediate stages of decay. In cases where extensive early or intermediate decay is present, an underestimate of decay is likely. It is important to consider that wood can suffer great loss of strength in these “difficult-to-detect” earlier stages of decay.

When used properly, the Resistograph proved to be a highly accurate tool for assessing tree decay. Tree people can breathe a little easier now, knowing that we can detect hidden hazard trees. Identifying hazard trees before they fall saves money, property and sometimes even lives!

*The author thanks the entire Decay Detection Study team. For more information on the study read: “Detection of Wood Decay in Blue Gum and Elm: An Evaluation of the Resistograph and the Portable Drill” in the November 1999 issue of the I.S.A. Journal of Arboriculture. A video documentary is also available from the author by email at: glioar1@earthlink.net. John A. Stepp is an arborist with the California Department of Transportation.*

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At the Forest Products Lab, the rough-cut blocks were further sectioned along the drill and Resistograph test paths, into 1 cm x 1 cm x 30 cm (.4 inch x .4 inch x 12 inch) lengths. The lengths were then cut into 60 identical 1 cm x 1 cm x .5 cm (.4 inch x .4 inch x .2 inch) wafers. Each wafer had a small hole from the Resistograph or drill.

Every wafer was then marked with an indelible number. The scale weight and electronic caliper readings of each wafer were taken and entered onto a computer spread sheet. There were a total of 22,680 wafers!

Each wafer was soaked in water to saturation, weighed, placed in a beaker of water, and the displacement recorded. The wafer was then kiln dried, re-weighed, and again placed in the beaker of water. Wood density—the amount of wood material present—was determined by weight and water displacement differences.

Since decay causes a loss in mass, a reduction in density can be used to identify decay.

Sound-wood density of blue gum is .65 g/cm³ and elm is .5 g/cm³. Bluegum wafers with density values greater than .5 g/cm³ were considered sound, while those below .5 g/cm³ had an intermediate or advanced level of decay. Elm wood wafers having densities greater than .4 g/cm³ were determined sound, and those below .4 g/cm³ had intermediate to advanced decay.

After the wood samples were measured for density and moisture content, they were laid out in sequence from bark to tree center for visual inspection. At this time, insect galleries and defects were noted, and later factored into the final assessments.

Other methods used to determine wood soundness, besides visual examination, density and moisture content, are the “pick test” and microscopic examination. In the pick test, a sharp instrument is used to pry up wood fibers. If the fibers break with ragged edges to the side of the prying instrument, this indicates sound wood fiber.

When the fibers give way directly above the prying instrument with clean edges (a “brash” break), they are considered decayed. Microscope and electron microscopic visual examination reveals wood fiber degradation and the presence of fungus mycelium.
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TREE CARE INDUSTRY - JANUARY 2000
I have to disagree with the popular assertion that "native plants" can be singled out as "easier and cheaper to care for." It's hard to find a more ambiguous criterion for an area where a plant naturally occurs. Plants migrate around the world by every means imaginable. Why is one variety superior to another simply because one arrived in a glacier and the other in a nurseryman's suitcase?

All varieties should be evaluated on their performance, not their geographic homeland. The important thing is that we choose a variety that will thrive in a given site. Put a Lacebark elm and an American beech side by side in a street planting in downtown Atlanta and you'll soon be stacking beech firewood in the shade of an elm tree.

Don't get me wrong, there are many great "native" trees. I've heard enough of the old saw of how the poor natives can't get any attention for all the sexy foreigners hanging around. If native trees have a bad rap, then quit grouping them together. October Glory (Acer rubrum) is a vigorous performer with spectacular fall color perhaps unrivaled by any tree. The fact that it is a "native" hasn't dampened its popularity one bit. It is deservedly one of the most planted trees in Georgia. On the other hand, its Asian counterpart, Acer buergeranum, clearly has better heat and drought tolerance when planted in one of our not-so-native concrete and steel landscapes.

I advise caution to those who preach the oversimplified message that natives are the answer. As for me, I stand with the tree that stands on its own.

John Barbour is with Bold Spring Nursery, Inc. in Monroe, Ga.
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