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Performing tree work in the 1940s required bull strength and a strong back.
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Forest ecosystems began evolving more than 300 million years ago. Trees and other land plants in these environments were faced with many natural stresses including extreme temperature changes, fluctuating levels of available soil water, soil infertility, catastrophic fires and storms, poor soils and competition. They evolved by genetic selection—survival of the fittest—and developed many physical, chemical and biological requirements necessary to survive these periodically stressed environments. Survivors were those that could form tremendous expanses of lateral roots to occupy soil volumes sufficiently large for them to obtain enough essential mineral elements and water to support their growth needs.

The most competitive trees in these ecosystems, then and now, were those with the largest expanses of root systems. Competition between trees occurs first between their root systems, and the winners are those that occupy the largest soil volume. Many mature forest trees have diameters of root spread that are four to five times the height of the tree. The non-woody, absorbing roots on these lateral roots of a mature tree can occupy as much as 150 cubic yards of soil.

Forest Tree Root and Soil Biology

One biological attribute formed by forest trees was the development of partnerships with specific soil microorganisms, including the obligate and symbiotic mycorrhizal (fungus-roots) fungi which colonize fine non-woody, absorbing roots. The majority are formed on lateral roots of forest plants in the upper 10 to 12 inches of soil.

In order to survive, forest plants came to rely on the many benefits provided by a great diversity of these microorganisms in their rooting zones. Beneficial bacteria live on the absorbing root’s surface ... the rhizosphere ... and solubilize many essential mineral elements, such as phosphorus, from insoluble mineral sources for eventual uptake by roots. Some fix gaseous nitrogen from the air in soil, decompose organic matter, produce plant growth regulators that stimulate root growth, and still others deter many root diseases.

There are also many species of soil fungi that contribute to the trees’ well being by decomposing organic matter which recycles and increases the availability of essential mineral elements. Their activity in soil can also curtail certain root diseases. In natural forest ecosystems root diseases are an exception—healthy roots are the rule. Usually it is only after significant changes in the populations of these beneficial microorganisms, and the subsequent imbalance in soil processes, that root diseases develop. In healthy forest soils and tree rhizospheres these beneficial microorganisms flourish in great numbers because that is where their organic food supplies are most plentiful. Their diets consist of organic matter on the forest floor ... mulch ... and in the mineral soil, as well as chemical exudates and sloughed cells from the growing absorbing roots. Other organisms, including actinomycetes, algae, protozoa, arthropods and worms, also exist in great numbers in healthy forest soils. These soil animals and insects, feeding in and out of the forest floor on the organic matter, and other organisms increase the aeration of the soil and the penetration and movement of water through the soil. Their feeding activity also mixes the mulch (forest floor) with the mineral soil, thereby increas-
The cobweb-like growth from these pine roots against a glass partition is mycelia of an ectomycorrhizal fungus. This shows the large increase in root surface area created by these fungi which are in contact with the soil. This feature of mycorrhizae allows for greater amounts of water and mineral element absorption from the soil, resulting in improved plant vigor and health. Photo courtesy of Dr. David Read.

Angel oak near Charleston, SC. This oak, estimated to be 1,600 years old, existed as a forest tree for most of its life. It has only been a park tree for the past 50 years. It is an ancient survivor of the intense competition in forest succession which allowed it to become a dominant tree in the forest.

Mycorrhizal Associations and Tree Health

Over 95 percent of land plants in the world form symbiotic relationships with mycorrhizal fungi. These unique, root-inhabiting, symbiotic fungi colonize either the outside of fine absorbing roots (ectomycorrhizae) or the inside of roots (endomycorrhizae). Ectomycorrhizae occur on about 10 percent of the world flora or about 2000 species of trees. Trees belonging to the Pinaceae (pine, fir, larch, spruce, hemlock), Fagaceae (oak, chestnut, beech), Betulaceae (alder, birch), Salicaceae (poplar, willow), Juglandaceae (hickory, pecan), Myrtaceae (Eucalyptus), Ericaceae (Arbutus), and a few others form ectomycorrhizae. Ectomycorrhizae do not occur on non-woody plants. In most forest situations, many species of ectomycorrhizal fungi exist on roots of a given tree. The degree of colonization may exceed 80 percent of the absorbing roots in healthy forest soils.

There are more than 5,000 species of fungi in the world that form ectomycorrhizae with forest trees. Most of these fungi produce mushrooms or puffballs as their sexual reproductive
stage. Many spores are disseminated by wind from these fruiting bodies which spread the fungi to new locations. Most ectomycorrhizae are large enough to be recognized with the unaided eye, and they occur in different shapes, sizes and colors. Many species of ectomycorrhizal fungi can be vegetatively propagated in the laboratory in pure culture on artificial media which is important in their practical application.

Endomycorrhizae, the most widespread of all mycorrhizal types, are found in three main groups. Ericaceous endomycorrhizae occur on four or five families in the Ericales and include _Rhododendron_, laurel, cranberry, blueberry and a few others. Orchidaceous endomycorrhizae are a distinct type that occur only in the plant family Orchidaceae. These two groups will not be discussed here.

_Vesicular-arbuscular mycorrhizae (VAM)_ is the third group of endomycorrhizae. Vesicles and/or arbuscules are structures produced by these fungi in the mycorrhizal roots. VAM have been observed in roots of over 1,000 genera of plants representing some 200 plant families. It has been estimated that over 90 percent of the 300,000 species of vascular plants in the world form VAM, including agricultural crops, grasses, fruit and nut trees, vines, desert plants, flowers, most ornamentals and many hardwoods. VAM fungi are ubiquitous in nearly all natural soils that have supported plants. Inoculum density and fungal species diversity, however, vary greatly in different soils supporting different species of plants.

Degraded soils contain few spores of VAM fungi, whereas, healthy forest soils, especially those supporting hardwood trees, are rich in them. As with ectomycorrhizae, the degree of root colonization by VAM fungi in a healthy soil can exceed 80 percent of the absorbing roots. In degraded soils the colonization can be as low as 10 percent. There are about 150 species of VAM fungi identified worldwide to date. VAM fungal colonization of absorbing roots do not change their size, color or shape, in contrast to ectomycorrhizal fungi. Due to this characteristic, VAM can only be confirmed microscopically and, therefore, are not discernible with the unaided eye. VAM fungi produce large asexual spores in or on roots in the soil and are, therefore, disseminated from one location to another very slowly by soil inhabiting animals and insects. Unlike many ectomycorrhizal fungi, VAM fungi cannot be grown in conventional pure culture on artificial media in the laboratory. In order to produce spore inoculants of these fungi, spores are produced from the VAM on specially grown plants and then extracted from the roots.

Host plants supply mycorrhizal fungi with simple carbohydrates (sugars) derived from photosynthesis, and other essential organic chemicals, such as vitamins and amino acids. A plant’s carbohydrate cost to support these mycorrhizal associations can exceed 20 percent of the total amount fixed annually from photosynthesis by the host plant. In return, fungi extend vegetative strands, called mycelia, far into the soil, increasing the surface area of the roots to improve absorption of water and essential mineral elements which are then transferred to their plant host.

Plants with abundant mycorrhizae have a much larger, physiologically active, surface area for absorption of essential elements and water than plants with few or no mycorrhizae. Ectomycorrhizae can increase the physical absorptive surface area of root systems by more than 700 percent compared to non-mycorrhizal roots. From an energy perspective, a tree would use approximately 100 times more photosynthetic (sugars) to form enough non-mycorrhizal roots with the same absorptive surface area equal to that provided them by the mycorrhizal associations. Most plants, especially trees, are simply not able to produce 100 times more photosynthesize, thus, they evolved an obligate partnership with mycorrhizal fungi.

Mycorrhizae are able to absorb, accumulate and transfer all of 15 major and minor mineral elements and water to trees more rapidly and for longer periods of time than non-mycorrhizal absorbing roots. Research has shown that mycorrhizae live longer in the soil than non-mycorrhizal absorbing roots and they increase the tolerance of their tree host to drought, compaction, high soil temperatures, heavy metals, soil salinity, organic and inorganic soil toxins and extremes of soil pH. They also depress many root diseases caused by pathogenic fungi, bacteria and nematodes.

In natural forests, many species of mycorrhizal fungi share common tree hosts and form a continuous, interconnecting network of mycelia between
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Trees occur in these artificial landscapes as a result of one of two deliberate events. Either they were growing in a forest before it became a man-made environment, or they were transplanted after development. The root systems of the on-site trees are routinely damaged during construction by trenching utilities and constructing drain fields, by compaction from vehicles, smothering with soil placement, and the ever-present urban floor (i.e., grass or concrete/aspalphalt roads, driveways and sidewalks) instead of a forest floor. Few forest soil characteristics exist for these trees in these environments.

Transplanted trees are routinely moved from a nursery to their new urban environment with less than 10 percent of their original root system that developed in the nursery. These trees may need 10 years under the best of conditions to replace the original expanse of lateral and absorbing roots, assuming there is room for them to grow. Soils in most man-made landscapes have little periodically renewed, recyclable, high-quality, native organic matter needed to drive the natural forest soil processes. Urban soils are usually compacted with poor aeration and low water storage capacity, and can have an increasing soil pH caused by frequent irrigation with alkaline and chemically-treated municipal water. In most man-made landscapes, we have eliminated many forest soil attributes still required by these urban trees.

**Mycorrhizae and Urban Trees**

There are practical solutions to some of these microbiological deficiencies in these man-made environments. Since the late 1970s, specific ectomycorrhizal fungal inoculants have been used in forestry on nursery seedlings of a variety of tree species to improve their performance in nurseries and on reforestation and adverse reclamation sites. Much research has been done with the puffball-producing fungus, *Pisolithus tinctorius* (Pt). Ectomycorrhizal formed by this fungus on diverse species of tree seedlings in nurseries have been shown to significantly increase their survival and growth on mined sites, degraded soils and reforestation sites throughout the world. Many other species of ectomycorrhizal fungi have also been shown to have practical significance (Marx 1991). A tremendous body of published scientific literature also exists on the practical importance of VAM to the propagation, growth and maintenance of trees, many horticultural plants and turfgrass.

This mycorrhizal technology has recently been modified for various applications to arboriculture. At the University of Michigan, northern red oak (*Quercus rubra*) growing in an established campus landscape had significant increases in absorbing roots and nearly three-times more ectomycorrhizal development following inoculation of their rooting zones with spores of Pt. The root response to this fungus was greatest on trees also treated with soil-injected organic biostimulants and micronutrients in a water solution. Non-inoculated (control) oaks had less than 20 percent of their absorbing roots colonized by native and naturally-occurring ectomycorrhizal fungi. These observations indicated that conditions of non-treated soil were not conducive to healthy root growth and function (Marx et al. 1995).

In France, Garbaye and Curin (1996) inoculated the backfill of 8-year-old basswood (*Tilia tomentosa*) trees at planting with a vegetative inoculant of several ectomycorrhizal fungi. After three years, they found that inoculation significantly increased height and diameter growth and also increased the incidence of ectomycorrhizal fungal diversity on these treated trees. The treatments also improved the mineral content of the leaves. Smiley et al. (1997) injected the root zones of mature willow oak (*Quercus phellos*), northern red oak, and pecan (*Carya illinoensis*) in a residential area in North Carolina with water suspended spores of Pt with and without a slow-release fertilizer (28-9-9).

After seven months, the fertilizer and Pt spores, applied separately, significantly increased the development of lateral roots, absorbing roots and ectomycorrhizae on all tree species. When applied together, how-
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Urban environments can be a “jungle” for new and established trees. Stress, depleted soils and poor availability of water can challenge even the hardiest trees and shrubs, and hasten the decline of aging or damaged trees.

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### AVERAGE FINE ROOT DRY WEIGHT (GRAMS PER CUBIC FOOT OF SOIL), SEVEN MONTHS AFTER TREATMENT

<table>
<thead>
<tr>
<th>Treatment</th>
<th>PECAN</th>
<th>WILLOW OAK</th>
<th>RED OAK</th>
</tr>
</thead>
<tbody>
<tr>
<td>MycorTree™ Injectable</td>
<td>22</td>
<td>19</td>
<td>11</td>
</tr>
<tr>
<td>MycorTree™ Injectable plus Boost</td>
<td>48</td>
<td>35</td>
<td>10</td>
</tr>
<tr>
<td>Bartlett Boost (28-9-9)</td>
<td>16</td>
<td>11</td>
<td>5</td>
</tr>
<tr>
<td>Water Control</td>
<td>11</td>
<td>9</td>
<td>1</td>
</tr>
</tbody>
</table>

*MycorTree™* Injectable produced a significant increase in root growth as compared to the non-treated controls. 

Journal of Arboriculture, May 1997

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however, the root responses were greater. Spores and fertilizer caused a 4- to 10-fold increase in lateral and absorbing roots, and more than doubled the ectomycorrhizal development on these trees. Development of native ectomycorrhizae on the non-treated (water only) root systems varied from 22 to 49 percent of absorbing roots. In another recent study (Marx, et al., 1997), the root zone of mature live oak (Quercus virginiana) growing in a highly stressed landscape in coastal South Carolina were injected with Pt spores in a water suspension with or without a soluble fertilizer (12-48-8). After six months, the injected Pt spores stimulated more root growth and ectomycorrhizal development than the fertilizer or control (water only) treatments. When spores and fertilizer were applied together, they increased the lateral and absorbing root biomass by four times and the ectomycorrhizal development that had been observed in the water-only control by three times.

In a companion study, other oaks received a vertical mulch application of a dry mix of Pt spores, a cocktail of soil/root bacterial spp., various organic materials, and a soil water-managing gel. Inorganic fertilizers were not used in any treatment. After four months, the vertical mulch stimulated six times more root growth, and twice the ectomycorrhizal development observed in the control treatment. In both of these live oak studies, Pt ectomycorrhizae accounted for over half of the total ectomycorrhizal development on the treated root systems. Natural ectomycorrhizal development ranged from 18 percent to 38 percent of the absorbing roots in the control treatments on these 200-300 year-old, 40-50 in.-diameter trees. In all of the above studies, ectomycorrhizal fungal populations also increased because they had more roots to occupy. The introduced fungi simply added to the existing fungal populations.

There are several studies underway evaluating the significance of VAM inoculants on the establishment and the growth of various hardwood species of different sizes and ages, and various shrubs and turfgrass in man-made landscapes in diverse locations in the United States and Europe. However, various commercial inoculants of these forest microbes are being operationally applied with great success at the time of transplanting, and during maintenance of various tree species and other plants on diverse man-made landscapes in the US and Europe.

Conclusions

A knowledgeable arborist or landscaper must consider the below-ground needs of trees they have acquired from their forest environment and design management protocols in urban landscapes to accommodate these important requirements. Good quality organic matter in soil, an organic mulch over as much of the rooting area as possible, a large volume of quality soil (i.e., preferred pH, good water storage, adequate available and reserve amounts of essential mineral elements) for maximum root expansion, adequate inocula of mycorrhizal fungi and beneficial soil/root bacteria, and a functional tree canopy to produce the energy for growth are a few prerequisites to healthy root development and function. If these conditions are not met, the arborist is forced to maintain these trees with the agricultural option, which includes abundant use of pesticides and inorganic fertilizers. These mainly synthetic chemicals, when used in excess, can inhibit or delay normal root and mycorrhizal function, forest soil processes and normal tree growth and development.

Since we have domesticated forest trees for our needs, we must manage them with their forest needs in mind to achieve high survival and healthy normal growth of trees in our adverse, nonforest-like urban environments. Until we begin to address these natural soil and root partnerships that have evolved with trees, we will continue to use an intensive care system in order to keep urban trees healthy.

Dr. Donald Marx spent 34 years with USDA Forest Service, where he directed the Institute of Mycorrhizal Research and Development. He is chairman and chief scientist of Plant Health Care, Inc. This article was excerpted and adapted from a seminar presented at TCI EXPO ’97.
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Preservation of Live Oaks in the Urban Forest

By Randy Harris and Dr. Kamran K. Abdollahi

These live oaks, growing in poor soil conditions, showed major signs of decline.

Rhizosphere was improved drastically by increase in mycorrhizae density.

Introduction

Live oaks, which are very vigorous and resilient trees, typically live about 150 years. Like all trees, however, as they get older they are more easily impacted by surroundings and have more trouble coping with the artificial environment of the urban landscape.

The urban environment imposes severe stress upon vegetation, and soil compaction becomes a serious problem for many established urban trees because it reduces root growth and development. Extensive research has tracked the effects of soil compaction on agricultural soils and forest lands. However, a much smaller body of research has documented the influence of compaction on urban soils and trees.

Urban soils are characterized by their modified structure leading to compaction, restricted aeration and water drainage, great vertical and spatial variability, and pronounced tendency to form a crust on the surface. Major compaction occurs in the process of landscaping, during which the top soil is either scraped off or stored in piles. In addition, soil is compacted as a result of vibration from street traffic, construction activity or people pressures—especially when it is moist. The extent to which a soil may be compacted is relative to its texture, type and degree of structure, organic matter content and its moisture at the time when the compressive force is applied. Gas exchange between soil and air under urban shade trees is often seriously impeded by soil compaction, sidewalks and pavement.

While it is often mentioned that compacted soil is common in urban areas, few investigations have been made to deter-
mine accurately the extent of the problem. One of the few pieces of quantitative information that documents the degree of compaction in metropolitan areas comes from a survey of soils located in the Washington, D.C. area. Compaction of several different types of soils studied resulted in an increase in bulk density from a range of 1.30 to 1.60 g/cm³ to a range of 1.70 to 2.20 g/cm³. Even this small amount of information clearly indicates the potential for serious soil compaction problems in urban areas.

Although several studies have described the effect of compacted soils on trees and roots, relatively few quantitative investigations have been completed from which specific recommendations can be made. Little work has been done with deciduous tree species, except decades ago by C.F. Korstian, W.M. Broadfoot and F.T. Bonner. The highly variable and sometimes conflicting results of researchers illustrate the need for up-to-date research conducted under more controlled conditions.

Several investigators have reported a reduction in tree vigor and growth as soil compaction and bulk density of soil increase. Alterations in root functions of trees growing in compacted soil eventually lead to deterioration of tree crowns and growth reduction, although the effects on growth may not be apparent for a few years. In urban areas, one of the most common causes of O₂ deficiency is the placement of fill around tree stems. Yelenosky studied the composition of soil air under a newly paved road, an unpaved parking lot, and an adjacent, undisturbed forest in Durham, N.C. The poorest soil aeration was found in an area where clay fill had been placed around stems of trees. Oxygen concentrations were as low as 1 percent and CO₂ content was above 20 percent in the soil under this fill. The next most poorly aerated soil was identified where a driveway was being constructed and paved with asphalt.

Unfortunately, stripping is the first operation to prepare most sites for development. All surface vegetation, organic laden topsoil and debris are removed, and the area is rough graded. This process usually leads to poor soil aeration and tree decline, usually beginning with problems in the rhizosphere.

Soil amendments can influence the physical, chemical, and biological properties of soil but are primarily added in an attempt to improve physical condition.

The use of wood byproducts as horticultural mulch has increased in the last decade as the horticulture industries and arborists have raised the public’s awareness of the aesthetic and maintenance benefits to be gained from mulch use.

Live oaks and Soil compaction

In recent years, more and more developers have taken considerable effort to save trees in order to retain or create a mature appearing landscape. Live oak trees provide a unique and majestic landscape attribute which, due to lack of sound arboricultural practices, are in the state of decline. Current information on tree preservation is limited, and much of
what is known within the profession is difficult or expensive to implement. This study documents a few practices that have led to a restoration of the live oaks.

**Objective**

1. To formulate a practical and low-cost soil amendment to restore and improve the health of stressed and strained trees.

2. To improve the rhizosphere of compacted soil.

3. To use this case study as a basis for a scientific research project addressing new formulations for soil amendment.

**Methodology**

Live oaks on the campus of Louisiana State University (LSU) were used for this study. After a campus tree survey, its was

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**Leaf Nutrient Analysis**

Leaf Nutrient (Thousands) ppm

<table>
<thead>
<tr>
<th></th>
<th>Stressed</th>
<th>Natural/Healthy</th>
<th>Strained</th>
<th>Treated</th>
</tr>
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<tbody>
<tr>
<td>N</td>
<td>20</td>
<td>10</td>
<td>15</td>
<td>5</td>
</tr>
<tr>
<td>P</td>
<td>10</td>
<td>5</td>
<td>7</td>
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</tr>
<tr>
<td>K</td>
<td>5</td>
<td>2</td>
<td>3</td>
<td>1</td>
</tr>
</tbody>
</table>

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**The Process**

**Step 1:** The first thing that needed to be done was to stop the flow of traffic. A barrier was established to stop compaction of the root system under the drip line.

**Step 2:** The soil was so compacted that a reading of 325 PSI per inch was recorded before the project. A rotor hammer was used to drill pilot holes, so that a liquified injection application could be administered into the soil.

**Step 3:** Liquid injection with PSI set at 130 for aeration of the compacted soil.

**Step 4:** An application of gypsum was applied at the rate of 40 pounds per 600 square foot.

**Step 5:** An application of an organic soil mix was applied at the depth of two to three inches. This mix consisted of: 50 percent sand, 25 percent hardwood chips and 25 percent horse manure.

**Step 6:** A layer of hardwood chips was applied at the depth of three to four inches, then watered heavily. A second application of hardwood chips was applied in the second and fourth years. No pruning or trimming was done for the first three years, to avoid causing open wounds.
determined that the live oaks could be categorized into three types. "Strained," "Stressed," and "Healthy." Strained trees were defined as those under poor soil conditions and showing major signs of decline. Stressed trees were those under poor soil conditions without any sign of decline. Healthy trees were defined as those under normal soil conditions, and without any visible or detectable signs of decline. Trees under study were fenced to keep traffic from within 10 feet of the tree driplines.

The following procedure and formulation were used in random on stressed trees three years before the final evaluation was completed:

1) Fracturing of the soil at 130 psi using a commercial soil fracturing system.
2) Gypsum was broadcast at the rate of 40 lbs per 600 ft².
3) Organic mix of 50 percent sand, 25 percent hardwood (urban tree residue) and 25 percent horse manure was applied up to 4 inches thick under the stressed trees (dripline plus 10 feet).
4) Additional hardwood mulch was applied every season.

The entire formulation and application was conducted only once in four years.

Trees were analyzed for leaf and soil nutrient levels, pH, Cation exchange capacity (CEC) and organic matter (OM). Soil respiration was measured using a portable soil respiration system (PP System Inc.). Soil was also sampled for macro-organism determination and analyzed at LSU. Root growth was measured by sampling the rhizosphere. In addition, the presence and relative abundance of mychorrizae were determined by Dr. Alex Shigo. Other measurements of trees and soil were made periodically.

**Results**

In general, treated trees were restored to healthy status three years after the initial treatment.

- Soil physical properties improved greatly by soil treatment.
- Soil nutrient content increased for treated oaks.
- Nitrogen, phosphorus and potassium concentrations were higher for...
treated trees than for healthy oaks on natural forest soil.

- Leaf nutrient content was significantly higher for treated trees than stressed and strained trees.
- Soil macro-organisms were greater in number and diversity for treated soil than others.
- Rhizosphere was improved drastically by increase in mycorrhizae density.

- Root growth was greater for treated trees than stressed and strained non-treated trees.
- Chlorophyll content increased as a result of soil treatment.
- Annual stem elongation was significantly higher for treated trees than non-treated.
- Rhizosphere activity increased as indicated by soil respiration measurements for treated trees.

Randy Harris works for the Department of Landscape and Forestry for the City of Baton Rouge. Dr. Kamran K. Abdollahi teaches Urban Forestry at Southern University and A&M. The authors would like to thank Dr. Alex Shigo, Dr. Chris Carlton and his staff and Dr. Jian Sun for their contributions and assistance.
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Winter Management Conference, held this year on Feb. 10-15 in New Orleans, is the premier opportunity to meet, learn from and exchange information with a broad spectrum of successful entrepreneurs. The 1998 conference features a truly impressive roster of speakers coupled with a nonstop selection of outings, tours and activities designed to appeal to the entire family.

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Optional outings offer the chance to explore the flavor and character of New Orleans, from tours on the river and bayou to plantation visits, cooking classes and a Cajun Fais Do-Do theme party that will send everyone home with a smile. The truly breathtaking Pavilion of the Two Sisters plays host to this year's Excellence in Arboriculture Awards banquet. And don't forget to sign up for the annual National Arborist Foundation Golf Tournament.

Winter Management Conference is a gathering of business experts and industry representatives who can help you advance your business. Every challenge you face in managing your tree care company has been analyzed and conquered by the people at Winter Management Conference. Come on down, share your victories with others and listen to how your peers overcome their hurdles. No other green industry gathering matches it.

"Management Conference" is such a formal title for what is, in truth, a relaxing, fun-filled exchange of information. It's late, but not too late to register! Don't let another February go by without discovering the potential of the NAA's Winter Management Conference. Call the NAA today at 800-733-2622.

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Marketing Strategies for the Growing Business

By Dick Proudfoot

Marketing

When a new customer is looking for tree care service, he doesn’t know you, your company, your level of customer service, what your company stands for, your other customers and, often, your reputation. All of these issues fall under the title of “Marketing.” Marketing involves image and the perception of your current and prospective clients, customers and advocates. Presumably, that’s how you regard your current and potential fellow business associates, as well. Often, we don’t know we need to change something we are already doing or add something until someone else points it out.

Is A Change Due?

The other day, I talked to a fellow I’ve known a long time who is a good NAA member. He had a salesman with him—one he wanted me to put some “pixie dust” on. While we were chatting I said, “Jim, you need to raise your prices,” which is my standard reply when someone has problems.

He responded, “No, I don’t.” He seemed to get a little upset with me and said, “We are already so expensive, it’s frightening.”

I replied, “Okay, fine! I didn’t understand that you are financially independent. Apparently, you really don’t need to go to work every day.” He’s been doing business for so long that it had become a habit. I don’t have any idea if he needs to change or not, but it was a suggestion he might choose to consider.

In order to determine whether a change is necessary, you must first decide what you want out of life and your business. Do you measure success as financial independence, or by another standard? Whatever your goals, they are not wrong. You must be sure, however, that your goals are in alignment. Only you can establish your goals.

Promoting Your Business

Marketing is promoting your business. Before you can do it, you must understand what it is. On an airplane two years ago, I sat with a gentlemen who was senior vice president of marketing for a company. Since I’ve always had an interest in marketing, I thought I was really going to learn some useful information. When I asked him his definition of marketing, he pulled a textbook out of his briefcase and opened it to a highlighted definition that was four paragraphs long. I have no idea what it meant.

We all try to figure out this magic concept of “Marketing.” During the same conversation I said, “I am not sure that applies to us. We are a small business.” He replied, “Yes, it applies to small business.”

When I requested a definition of small business, he replied, “Man, I hadn’t thought about that before.” After a minute or two he answered, “Well, I guess that would be a company with three or four hundred employees and around $100 million in sales.”

Well, if that’s who those books are written for, we shouldn’t be reading them. I’ve thought about marketing and came up with my own definition: “Marketing is everything we (as business owners and employees) do to influence more people to buy from us then anyone else.” If you understand this, you’ll understand how marketing affects every part of your business. It’s part of everything that you and your company do, and it includes image.
Project A Good Image

When you talk about what you do and the services you provide, you probably use words like “best, quality, cutting edge technology, etc.” Prospective clients should see your employees wearing your uniforms (or jackets with your company name emblazoned on the back). They won’t associate quality if they see dirty T-shirts or shorts, torn jeans and dirty hands. You are being “marketed” when your employees are on and off the job. That is why my definition of marketing is “Everything you (or your employees) do or use to influence prospective customers to purchase expensive, professional, high quality, tree care from you.”

Develop a Marketing Plan

Once you accept my definition of marketing, there may be a lot your company needs to reconsider: estimates, forms, trucks, saws, ladders, uniforms. In addition, there is telephone courtesy—how you return calls and how you schedule. Are your prospects confident about commitments you are making? Will your salesman show up on time? If you are hired, when will the crew be there? All of this is marketing. Write things down so the customers can read it, then share it with them. Do it on a piece of tablet paper, it doesn’t have to be fancy.

Here are some other items you will want to consider, most of which involve very little (or no) investment.

Your business cannot survive without telephones. You are already paying for them, why not utilize them? Most of you probably have one person who answers the phone all day. It could be your husband, your wife, bookkeeper, secretary or some combination, but most likely there are one or two people whose primary responsibility is to answer phones. Train them to fit your marketing plan and to achieve goals you have set for yourself, both personally and professionally. It’s extremely important that phones are answered correctly.

Make sure uniforms are clean. We only get two or three minutes to make a good first impression. When a prospective customer meets your people, they should not be covered in a week’s worth of dirt. If they are on a job, they will most likely be soiled from their current job. People can tell the difference. If your logo or your vehicles are a certain color, the uniform should also have that color, for instant recognition. Obviously, your company name should stand out and everyone should look the same. If you really don’t understand the value of uniforms, there are a lot of very interesting studies that will confirm their importance to you.

Clean the vehicles, too. The same standards apply to paint, vehicles and equipment. I saw a pretty new bucket and one of those really expensive Bandit chippers going down the road the other day. There was another chip truck and another Bandit behind it, both of which were filthy! Even though I recognized the company name, I would wager the average prospective customer couldn’t; if they did, they were thinking, “Wow, I don’t want them making my property dirty!” Think about that. I don’t care if it just rained yesterday. That was not clean dirt on the truck, it was “dirty dirt”—dirt that had been there for a long time. Last week’s dirt.

Drop your name—everywhere. We’ve already discussed the logo or company...
name. It doesn’t have to be anything exciting or unique, but you should have it on everything you own. This includes business cards, proposals, letterhead, envelopes, Thank You cards, trucks, chippers, chain saws, hard hats, etc. You don’t need a gimmick, you just need to be recognized in your market. You already have it (the name or logo), now use it! Put it on everything.

Stay organized. Office procedures are super important! We go out in the field looking good and sharp. We are quality, expensive, reliable, the best. We are going to be here for the long term, and our customers will need us next year, too. All that effort is wasted if your crews don’t show up as promised. Everything clients learned about your company is ruined. There may be a dozen reasons why they’re late, but all your customer knows is that the job isn’t done.

Fix your problem areas. Figure out what your problem areas are, and fix them. You don’t have to do it personally, delegate to some one else in the office. We all do things that irritate customers. If you don’t know how to determine these problems, put a note pad by the telephone. Every time you get a call from a customer that you don’t want to take because you know what it’s about, write it down.

Empower Your Employees. Empower each of your employees to provide the absolute best customer care on the spot.

Be Noticed. Do you know about McKay-66? Harvey McKay is the guy who sells envelopes in a super competitive business. He figured out a few things. One is the “66,” and the other is that his trucks spend an incredible amount of time on the streets of Manhattan and other large cities. Do you know what they are doing a good bit of the time? Nothing, they are parked! They are parked between huge office buildings with people in them—people who purchase envelopes. He must have thought to himself, “You know, those people might look out that window once in awhile! I am going to put my name on the top of the truck, too.” This gimmick causes more comments than his name on the sides of the truck. This is just an example of some real innovative, creative, low-cost marketing. Harvey is extremely
successful and makes millions of dollars selling low-bid envelopes. Do you know how he does it? He says there are 66 basic things you need to know about every one of your clients. You want to know names of their wives and daughters, where their daughter is going to school, family pets, activities the kids participate in, what kind of airplane, boat, motorcycle, etc. the client has. I want to talk to customers about “people” things, not about low-bid, free work. When I call, I say, “Dan, how are you doing? This is Dick. How is Mary doing at Georgetown? I was just down there and I was thinking about her. Next time I’m there, would you like me to give her a call and take her out to dinner? I’d be happy to.”

Sales

Price is never the determining factor in purchasing. Purchase decisions are always, without exception, emotional decisions. They are never, ever, intellectual. I have spent my life with people telling me, “Dick that might work in Portland, but we are different.”

Shigo says, “Don’t believe anything I say. Question everything I say, because it’s only when you begin to question that education begins to take place.” So, explore it and look beyond. Maybe it’s an issue of what I call “head trash.” I’ve said all my life, “Business is never, ever good or bad in the marketplace—ever. It’s only good or bad right here between our ears. We are the ones who make those decisions.”

Selling should also be part of your marketing plan. There are many professional sales training instructors around the world who can teach you (and your employees) how to sell more successfully. They will teach how to get more jobs at lower prices, and less jobs at higher prices. They can teach how to qualify over the telephone so your people only see five people a day instead of 20, but they sell to all five. You had to learn how to take care of trees, now you need to learn how to sell your services professionally.

Customer Service

You need a client service plan. The goal of your company is (or should be) to turn prospects into customers. A customer is someone who says, “Yes, I want you to do the work.” You don’t have a relationship with them. To develop a relationship, you begin to get McKay-66 information and apply it to each client.

Customer, Client or Advocate?

A client is someone we have taken under our protection, who is now our responsibility. It’s your responsibility to maintain their landscape, to get out there and inspect it. It’s also your responsibility to take care of the “people” issues on that property. It’s your responsibility to keep those people happy and satisfied all the time. If you do that, you’ll then move that client to an advocate. You will know whether or not a client has moved to the advocate position when you, as a salesperson, are on that client’s personal Christmas card mailing list.

Advocates go to the state capital or around town running errands. They are at city hall fussing about the city trees—they are busy. Wouldn’t it be nice if all those people were on your unpaid payroll?

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We have a reward at Pruett called an “Attaboy.” If we receive a little note back from a satisfied customer (telephone calls don’t qualify), we pay the crew an extra dollar an hour for all the time they were there. We also copy it and put the copy on the bulletin board in the crew room. It doesn’t hurt to show the originals to prospective customers either.

More Name Dropping

There are ways to keep your name floating around. Let’s start with “counter toppers.” You can write a little piece called (for example) “How to Choose a Tree Care Company.” Door hangers sell in neighborhoods your crews are already working in. They are great.

Compliment Competition

I love to call our competition. If we see a property that we want, we call the owners, especially if one of our competitors is working there. We are absolutely up front and state, “Hi! This is Dick from Pruett. I want you to be my client. I see General Tree there, and it is a wonderful company. I know the folks, and they are great. I also have seen the work they are doing on your property, and it’s super. Would you help me? Everybody wants some help. Visit with me for just a few minutes, and help me understand how I can do a better job in my company, and how I can do for other people what General’s doing for you.”

You don’t have to hire a marketing firm. You have market information readily available. That homeowner will tell you—at no charge.

Hold an Open House

If you want to set yourself apart from the competition, clean your place up, polish the trucks, serve some wine and cheese, and invite people into your business.

Conclusion

I’ve talked to thousands of tree care company owners. All are honest people, and when push comes to shove, every one will finally take care of the customer—but many times only after a fight. Well, if that is part of your marketing plan fine, but if it isn’t, maybe you ought think about how you create satisfied customers. That is the greatest business secret in the world—satisfying clients so that they want to repeat the experience. They want to save a tree by having you come back again and again. That is where all the magic is. That is an advocate.

What we think, or what we know, or what we believe is, in the end, of little or no consequence. The only consequence is what we do.

Dick Proudfoot is owner of Pruett Incorporated in Lake Oswego, Ore., and president of the National Arborist Association. This article was excerpted and adapted from a seminar presented at TC1 EXPO ’97.
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Snorkel Acquired by OmniQuip

OmniQuip International, Inc. of Port Washington, Wisc., recently purchased Snorkel, a leading producer of aerial work platforms, from Figgie International, Inc. The transaction included $100 million in cash, with additional consideration of up to $50 million based on Snorkel's net sales between April 1, 1998 and March 31, 1999.

Under the new corporation, Snorkel will be managed as a separate business within OmniQuip’s portfolio and will continue to be based in St. Joseph, Missouri. Rick Solon will continue as president and all other senior managers are expected to remain in their positions.

OmniQuip International is the largest North American producer of telescopic material handlers, marketed under Sky Trak and Lull brand names. They also manufacture a line of skid steer loaders and other compact material handling equipment marketed under Seac Trak and Workpro brands. OmniQuip's products are used in a variety of applications by commercial and residential building contractors, as well as customers in other construction, military, industrial and agricultural markets.

Internship Directory Available

American Association of Botanical Gardens and Arboreta offers a 32-page directory of paid and unpaid internships across the nation. Internships '98 is organized by position and state, making it easy to find the perfect match between career goals and location. In addition, some offer lodging, college credit, and other benefits. Each listing contains duties required, application deadlines, contact names, and work schedules.

The directory is sent free to student members, and is available for a nominal fee to others. For more information or to request a copy, call 610-925-2500 or write: Internships '98, AABGA, 351 Longwood Road, Kennett Square, PA 19348.

American Association of Botanical Gardens and Arboreta promotes the value of organizations involved in the display, study and conservation of plants for public benefit.

National Conference

The National Arbor Day Foundation, in cooperation with USDA Forest Service, is hosting “Storms Over the Urban Forest,” a conference designed to help communities prepare for disasters.

The program will provide a forum for managers to exchange ideas and learn about new opportunities for disaster management as it relates to natural resources.

The conference will be held at Arbor Day Farm’s Lied Conference Center in Nebraska City, Neb., on May 18-20, 1998. Registrations are being accepted now. For more information, contact 402-474-5655.
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Bandit Industries, Inc. has recently introduced an upgraded version of their Model 3680 Beast Recycler. New cutter head design allows more efficiency in processing solid materials, new cutter teeth allow for a wider range of finished product, and the new fixed cuttermill design improves uniformity of the finished product. In addition, the new in-feed conveyor chain provides more aggressive feeding action and a longer conveyor life. Shaft and bearing sizes have been increased to meet heavy grinding applications, and the discharge conveyor has been lengthened. This new model yields approximately 150 to 200 cubic yards per hour of finished product from brush, 300 cubic yards per hour of finished product in re-grind applications, and 75 to 150 cubic yards per hour of finished product from logs and stumps. For more information, contact Bandit Industries, Inc. 6750 Millbrook Road, Remus, MI 49340. Phone toll-free: 1-800-952-0178 or 517-561-2270; Fax: 517-561-2270; E-mail: brushbandit@worldnet.att.net; Web site: http://www.banditchippers.com.

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Especially constructed Kermantle arborist rope end fittings, developed by Esmet, are easily installed by the user with ordinary tools. Holds the full-rated strength of the rope and meets the requirements of NFPA 1983 for auxiliary equipment. Electroline fully reusable end fittings are available for 7/16, 1/2 and 5/8 inch diameter ropes. Free catalog available from Esmet, Inc., 1411 Sixth Street SW, Canton, OH 44707-4471. Phone: 800-321-0870, ext. 122.

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Inserting growth regulator material into the ground has just gotten easier with a new soil-injection system developed by DowElanco. Available from Weed Systems Equipment, Inc., the battery-powered Kline Injector easily adapts to a backpack (2.5 gallon), hand- or pull-cart (9 or 15 gallon) or skid-mounted (15 or 25 gallon) unit. Although the unit operates much like a gas pump, an electronic flow meter indicates exactly how much solution has been injected. This feature makes this the most accurate soil injector currently available. For more information, call Ty Paulk, Weed Systems, Inc., at 1-800-881-0405.

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The Original Treestrap, manufactured by GCS, Inc., has been evaluated and approved for use on highway landscape projects. New York State’s Department of Transportation Landscape Architecture Bureau has added the product to their supplemental materials list. A Tree Guying and Staking Detail is available for use in Landcad programs. For more information, contact GCS, Inc., 230 Center Street, North Wales, PA 19454. Phone: 215-661-9070; Fax: 215-661-9071.

You now have a great alternative to heavier, high maintenance hydraulic units with the Van Ladder from Brink’s Manufacturing. This electric aerial ladder is durable, lightweight and sensibly priced. At approximately 600 pounds, this ladder gives 35 feet of working height in a self-leveling fiberglass bucket. Mount on any van or pickup truck, down to a one-half ton vehicle with universal mounting hardware. No outrigger needed. For more information, contact Brink’s Mfg. Co., Inc., 2020 Pioneer Trail, Albert Lea, MN 56007. Phone toll-free: 1-888-887-5847 or (507) 373-8095; Fax (507) 373-9078.

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Even sound-sensitive neighbors won’t be bothered by Stihl’s new gas-powered chain saw. The sound pressure rating is only 68 dB(A) measured at 50 feet. Stihl’s engineers added a quieter muffler, modified air filter cover and a rubber grommet to the cylinder cooling fins to channel air flow more effectively. In addition, with the new narrow kerf, Picco Micro Narrow saw chain, it’s in a class by itself. For more information, contact STIHL Inc., PO Box 2015, Virginia Beach, VA 23450-2015. Phone toll-free 1-800-GO STIHL (1-800-467-8445) or (757) 486-9100. Web site: http://www.stihlusa.com.

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ISA-33rd Annual Penn-Del Shade Tree Symposium & Trade Show  
Lancaster, PA  
Contact: E. Wertz at 215-795-2096

**February 4, 1998**  
Michigan Arborist Association  
Insect & Disease II  
Toll Gate Convention Center  
Novi, MI  
Contact: Michael Jasso at 248-391-0030

**February 9, 1998**  
Horticultural Concepts  
Arborhealth Series Part I  
(Part II to be held March 16)  
Peninsula, OH  
Contact: Carrie or Bill at 330-678-0295

**February 10, 1998**  
Michigan Arborist Association  
Management Cost Accounting & Motivation for Foremen & Supervisors  
Toll Gate Convention Center, Novi, MI  
Contact: Michael Jasso at 248-391-0030

**February 10-15, 1998**  
NAA Winter Management Conference  
Hotel Inter-Continental  
New Orleans, Louisiana  
Contact: Carol Crossland, 603-673-3311

**February 17-19, 1998**  
Landscape Contractors Assoc. MD•DC•VA  
Winter Workshop 1998  
Univ. of Maryland Shady Grove Center  
Rockville, Maryland  
Contact: Anne Trone at 301-948-0810

**February 24, 1998**  
University of California Extension  
Selecting, Planting & Caring for Palms  
One Day Seminar  
Riverside, California  
Contact: 909-787-5804

**February 25-26, 1998**  
Southern Illinois Grounds Maint. School  
Gateway Convention Center  
Collinsville, IL  
Registration Deadline: February 12  
Contact: Ron Cornwell at 618-692-9434

**February 27, 1998**  
Ecological Landscaping Association  
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**February 28, 1998**  
Long Island Arboricultural Association, Inc.  
Annual Tree Conference  
Hofstra University  
Pre-registration ends February 20  
Contact: LIAA at (516) 454-6550

**March 1-3, 1998**  
National Arbor Day Foundation  
Tree City USA National Conference  
Lied Conference Center  
Nebraska City, NE  
Contact NADF at (402) 474-5655

*continued on page 34*
It is common sense that electric wires can be hazardous to anyone doing tree work. OSHA Standard 1910.33 states that only qualified employees can come within ten feet of an overhead energized electrical conductor. Plus, OSHA Standard 1910.269 clearly defines who is legally permitted to work within the ten foot boundary. Finally, ANSI Z133.1 dictates very specific training and operational requirements that all tree care personnel need to follow for safety's sake.

**NAA Training Makes Sense.** The National Arborist Association has exactly the training you need, whether you are a residential/commercial arborist or municipal arborist. It's our Electrical Hazards Awareness Program. EHAP offers a simple, economical and practical way to provide training needed by your employees. This program creates awareness of electrical hazards, which is absolutely essential for all tree workers. Plus, EHAP can be used by line clearance tree workers to supplement mandatory training requirements specified in 1910.269.

Like all NAA training materials, EHAP is easy to use and easy to apply. The program is self-paced, to put your employees in control of meeting their goals, and presented by you, to keep you in control of your business. For more information about EHAP, or any NAA program, or to order, call our toll-free hotline, or send/fax the coupon below.

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Contact: Michael Jasso at 248-391-0030

March 10, 1998
Tree & Landscape Care Workshop
Ramada Plaza Carowinds
Fort Mill ("Charlotte"), SC
Registration Deadline: February 25
Contact: Jeanne Campbell at 864-656-2479

March 10, 1998
National Arbor Day Foundation
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March 12, 1998
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American Society of Consulting Arborists
1988 Arboricultural Consulting Academy
Arbor Day Farm (Lied Conf. Center)
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April 18-21, 1998
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UAA at 217-355-9411

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Chainsaws, Footwear & Safety

I am writing about the article entitled, "Footwear for Arborists," in the December 1997 issue.

There are several things regarding form, fit and function of footwear which were not addressed. Anyone who stands on his feet all day needs to be told more, so that good choices can be made.

Because your body weight is supported by the feet, footwear can have either a positive or negative affect on the rest of your body. Blisters, sore ankles, legs and back pain are just a few things that can be avoided by proper foot measurement, good fit and the selection of good boots. Issues such as different heights and types of heel can be chosen for specific jobs—for foot locking when using ropes for climbing, or for added security with climbing spurs.

Proper fit requires accurate measurements at the heel, instep and ball of the foot. Without good measurements, a buyer who should wear size 9-1/2 E will purchase a Size 10 D, so there's enough "room" across the widest part of the foot. This results in the arch of the foot not receiving enough support, as well as looseness around the heel which can cause blisters. Good footwear, made of high grade leather, will feel snug at the ball of the foot and "roomy" at the toes (a distance of 3/4 inch to 1 inch from edge of toes to inside of boot).

Every chainsaw injury can result in severe damage to a leg, foot, hand or arm. Chainsaws do not slice the same as a knife. A chainsaw cut is a tearing and pulling injury that can quickly sever bones, ligaments and tendons. Chainsaw injuries do not receive the same press as auto accidents, fires or plane crashes. When there are only a few injured persons per state in a year, it's not "hot news." When a tree care professional gets a severe foot injury, his first concern after medical attention is, "How do I support my family?" The severity of some foot injuries can cost in excess of $150,000, not to mention lost productivity from a good employee.

While there may be reasons why OSHA should distinguish between arboriculture and silviculture, personal protection for the chainsaw operator should not be included. A chainsaw will never make a distinction between a logger who is cutting down a stand of 50 trees from an arborist who is removing one tree from someone's yard.

One aspect of this article seemed to contradict another article written by Amelia Reinert, in which she discussed how safety requires a cultural change. To state that, "We're just not recording accidents involving cut feet in any significant statistical percentage" makes me believe that cultural change will only occur when more injuries cause insurance premiums to rise.

Because the development of standards, test methods and certification took more than six years, I take issue with the idea that "chainsaw protective boots for tree climbers is a solution in search of a problem." The potential for severe foot injury is there whenever you turn on a chainsaw.

Vince Diaz, General Manager
SawJammer Company, LLC

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Art in Arboriculture

By John A. Keslick, Jr.

Since 1993, Keslick & Son Modern Arboriculture Products, Education and Service of West Chester, Penn., has been involved with a form of eco-art known as nurse logs. Our contribution to the arts in modern arboriculture has met with widespread approval, as has our participation in the Feed the Children/Feed the Soil project in which profits from the sale of the logs are donated to local charities concerned with issues such as organic baby food.

Not only do nurse logs enhance the beauty of the landscape, they increase the vitality of the living soil, trees and associated organisms. Nurse logs return some of the elements taken from the soil and enhance enzymes such as those which turn cellulose into sugar. They also serve as water reservoirs, as well as shelters for beneficial fungi.

A few more words about some myths. Contrary to rumors, nurse logs do not constitute a fire hazard once soil contact is made. They do not spread diseases. We do not take the logs from forests, but rather from “take-downs” in urban areas.

Editor’s note: The myth about the spreading of diseases by nurse logs relates specifically to decay organisms. A nurse log will not spread these organisms to other trees. Decay organisms gain entrance to a tree by a complex process of interactions. The introduction of a nurse log will not speed this process. That being said, it’s still not a good idea to use a nurse log from trees infected by infectious diseases such as Dutch elm disease or oak wilt!

Do you have a product or idea for Arborist Innovations? TCI will pay $100 for published articles. Submissions become the property of TCI and are subject to editing for grammar, style and length.
Whether you are new to the Internet or an avid web surfer, you'll find what you're looking for on Arbortech's web pages. Those new to the "sport" of netsurfing will find large, easy-to-read type, straightforward information, and two links to bring Arbortech's name and products to your screen for review. More experienced surfers will note a "no frills" site, with clear, crisp pictures and a description of the services, products and packages available. A convenient rest stop for weary net travelers—a first-step site for company owners gathering information for a purchase.

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TCI
The Secret to Pricing for Profit

By Phil Nilsson

Time is money—a phrase well suited to the tree care business. Accurate time estimates are vital—not only to bidding the work, but scheduling crews and measuring results. Time (payroll cost) is the largest individual expense, so from a management view, it's the thing to control.

While we can't stop time from going by, we can predict requirements for doing work and completing it within time frames. The closer your estimated times compare with “reality,” the more accurate your bids become. Drive-by bids, and hit-or-miss approaches aside, it's absolutely impossible to intelligently bid jobs without knowing the time required for each phase of work. To appreciate this, you must understand two concepts and use them each time you bid a job. These aren't practices and principles that are locked up within the pages of a book about job estimating that you've read and forgotten. They are cast in stone and you will drag them to each job site. Get careless with either, and you'll lose profits.

First is the “Scope” of the work. How much work is there and what's involved? Knowing requires measuring, counting and calculating. If you get “lazy” at this stage, you are already guilty of not doing your homework. Success, failure, or mediocre results start with the bid. Research and reasoning keeps you “on the level” and “on target” to develop a “responsible bid.” A responsible bid joins others within a pool of averages. For every 10 bids, one is too high and one is too low; the other eight are close together in a cluster. That's where you'll find “responsible bids.” Those bids were prepared by tree care professionals who know what they're doing, and are on the same wavelength. Knowing the job, in this case, provides an opportunity to earn a realistic profit.

Now that we're on the subject, what is profit and what is reasonable? A profit is $50,000 to $100,000 in your pocket after the season ends. There are plenty of people who don't make that kind of money, because they underprice their bids. The curse of the industry is to devalue your worth. Since the tree care industry doesn't yet have pricing or hourly rate standards, you and everyone else are at the “mercy” of each and every “cluster” of job bids received by potential customers. It's too bad that many have already failed at this early stage.

Personally, I feel the ultimate “cure” will be to convert the whole industry to an hourly rate system, similar to the auto repair industry. This way, hourly rates will be posted and customers will select “contractors” based on their experience and expertise. No one will have to guess at how many hours a job will take and you'll be able to provide an estimate taken from a pre-written “manual,” just like at the garage. Instead of

As competition increases and under pricing continues, it keeps everyone together in the ‘poor house.’ I'm ready for the tree care industry to come together and vote itself a raise. What are you ready for?
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For information, call the ACRT Institute of Arboriculture & Urban Forestry at 800-847-3541, extension 211, fax 330-945-7200 or e-mail to LynnK@acrtinc.com. ACRT's new web site, http://www.acrtinc.com, has information on all training materials and programs.

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competing based on price, you’ll compete based on your reputation, ability and availability to handle the job. Isn’t that how you choose which repair shop works on your cars? Converting would simplify our business, so more time could be spent doing work, not agonizing for countless hours figuring out what to charge for a job.

Many customers have tree care companies return once, twice, three times or more over different years to bid on the same property, but against other contractors. It’s hard to win when there are so many variables. Bidders carry the burden of competition while the customer has the privilege of determining to choose the services of the lowest bidder—each time he puts the same job out to bid. That’s the reason that garages don’t give fixed prices, except for obvious jobs like an oil change. There are too many variables.

“So,” you ask, “What is the secret to pricing jobs in the absence of an hourly rate system?” Time. Unlike the auto mechanic who has the luxury of giving customers a time frame of “one to three hours,” you have to be much closer. In fact, in most situations if you miscalculate by as little as 25 percent, you have over or under bid. What you thought would take an hour, takes only 45 or as long as 75 minutes. There’s not much room for error if you are to be extremely competitive.

With all the “pot shots” taken at pricing, it’s a miracle that you end up with the right jobs at the right price. It’s ridiculous, to say the least, but at the moment it’s the system you are working with. Obviously, that needs to change for two reasons.

First, because of the time and difficulty involved in assessing the scope of work and preparing a bid that recognizes cost and profit. Second, because you’re entirely at risk for being 100 percent correct. Unlike the auto mechanic who gives you a price “range” and then bills you for actual labor and materials, we haven’t been doing that. Why? How can we change this? Forming an alliance, getting everyone licensed and complying, would simplify and guarantee profits. At the moment, our only real guarantee is that, without exception, the customer is absolutely guaranteed the lowest price.

In a related industry, landscape contractors are experiencing pricing levels that are way out of line. Prices for an hour’s work are close to what they were 10 or 15 years ago. In other
words, the industry is going backwards! I'd guess that on the average, owners as individuals are giving up and sacrificing personal earnings of about $30,000 or more a year. As competition increases and under pricing continues, it keeps everyone together in the “poor house.” I'm ready for the tree care industry to come together and vote itself a raise. What are you ready for? Think about it. Work is being bid at $25 or $30 an hour, and that's at the lower end of the scale.

The problem with these prices is the understanding of labor hours needed for maintenance or installation jobs remains a mystery. You're not making those rates if you charge $30 an hour and the actual job takes longer than an hour. That's why a conversion to an hourly rate system is the preferred method. I know plenty of people who are charging as low as $25 an hour, but when asked how accurate the hours are, they aren't sure.

Many don't keep records and figure the work will just “somehow” take as long as they estimated. Herein lies the problem. Customers win the battle every time. The main problem in many parts of the country is that pricing is too low; it's actually a “giveaway” price. Compared to others, as well as the investment in equipment, seasonality and level of difficulty in jobs, tree care companies should be charging $40 to $60 an hour.

For several years, I’ve been thinking about how to convert this industry from the “fixed price bidding system” to the hourly rate system, which I believe would enhance profitability and truly get everyone on the same “wave length.” If you’ve got suggestions on how this might be accomplished, I'd like to hear from you.

Phil Nilsson is a green industry consultant with over 20 years of experience and the author of over 39 books. The views expressed here are his own.
One of the most important pieces of equipment in tree care, an aerial lift, has become so common that even the smallest companies have added them to their equipment lists. More arborists are using them without a large, expert maintenance division to keep them up and running. As a result, it is up to everyone in the company to stress safe work practices and maintenance unique to their lift and keep an eye out for wear and tear. Regular safety inspections will not only decrease the incidents of accidents and injuries, they will save companies money on insurance. And they are required by OSHA.

The ANSI Standard for Vehicle-Mounted Elevating and Rotating Aerial Devices (A92.2, revised in 1990) was developed to prevent accidents associated with the use of aerial lifts. This, the ANSI Z133.3 Standard and your owner’s manual should be the guides for training your personnel and maintaining equipment.

Like every piece of equipment at an arborist’s disposal, aerial lifts shall be inspected regularly to maintain the peak level of safe and efficient performance. A daily walk-around inspection, required by ANSI, only takes a few minutes, so don’t rush it! Take care, too, that a daily inspection doesn’t become so routine that you end up only going through the motions.

Before you hit the road

The inspection items below should be adhered to for your own safety. Follow the instructions of the manufacturer, ANSI Standards, OSHA regulations and any additional safety measures that meet or exceed the checklist below. Keep a signed and dated record of each inspection. Any suspect items must be carefully examined and determination made by a qualified person as to whether they constitute a safety hazard. All unsafe items must be repaired before further use.

Inspection checklist
The following items should be inspected daily before you head out to work.
- Hydraulics Control
- Safety Power Lock System
- Fiberglass Components (Clean, Dry and Free From Structural Damage)
- Fuel Supply
- Safety Belt and Rings
- Non-Over-Center Stop Valve
- Fiberglass
- Visual & Audible Safety Devices

The next set of items should be inspected weekly.
- Hydraulic Lines for Leakage
- Hydraulic Fuel Level
- Accessories, Winches, Jibs

This last set of items should be inspected monthly.
- Tires & Brakes
- Structural Members, Welds
- Hydraulic Cylinders for Leakage
- Tightness of Bolts & Other Fasteners
- Sprockets, Pulleys, Pins, Chains
- Winch & Jib Assembly
- Rotator Assembly
- Platform Dump Assembly
- Accumulator Gas Pressure
- Leveling System Cables & Rods
- Lift System
- Safety Interlocks
- Electrical Wiring
- Unloading & Reducing Valve Setting

If equipment contact is made with an overhead power line:

- Do not touch the equipment if you are on the ground next to it.
- If you are operating mobile equipment that has contacted a power line, attempt to move it away from the line only if you feel you can do so safely.
- If moving the equipment safely isn’t feasible, remain on the equipment and call for help, warning someone approaching not to touch the equipment or any lines which may have fallen.
- Have such persons contact the local electric company immediately and follow their instructions.
- If no one is around, and if faced with an emergency such as fire, jump with both feet together and hop or shuffle away from the equipment.
Winter driving

Make sure your vehicle is ready before driving in winter weather. You should make a regular pre-trip inspection, paying extra attention to the following items.

Coolant and anti-freeze
Fill the cooling system and check anti-freeze level to protect against freezing.

Heating and defrosting
Make sure the heater and defrosters work. If you use other heaters and expect to need them (e.g. mirror heaters, battery box heaters, fuel tank heaters), check their operation.

Wipers and washers
The windshield wiper blades should be in good condition and the wiper blades must press against the window hard enough to wipe the windshield clean. In bad weather, the windshield washer will be used frequently, so check to see if it is full. If you can't see well enough while driving (for example, if your wipers fail), stop safely and fix the problem.

Tires
Make sure you have enough tread. The drive tires must provide traction to push the aerial lift over wet pavement and through snow. The steering tires must have traction to steer the vehicle. Enough tread is especially important in winter conditions. Use a gauge to determine if you have enough tread for safe driving.

Tire chains
You may find yourself in conditions where you can't drive without chains. Carry the right number of chains and extra cross links. Make sure they will fit your drive tires. Check the chains for broken hooks, worn or broken cross links, and bent or broken side chains. Learn how to put the chains on before you need to do it in snow and ice.

Lights and reflectors
Clean the lights and reflectors and check them from time to time during the day.

Windows and mirrors
Remove any ice or snow from the windshield, windows and mirrors before starting.

Hand holds, steps and deck plates
To reduce the danger of slipping, remove all ice and snow from all surfaces which you must use to enter the cab or to move about the vehicle.

Exhaust System
Exhaust system leaks are especially dangerous when cab ventilation may be poor. Loose connections could permit poisonous carbon monoxide to leak into your vehicle. Check the exhaust system for loose parts and for sounds and signs of leaks.

Maintaining fiberglass booms
A significant issue for tree care companies is proper boom maintenance. Proper cleaning and regular examination will prolong the active use and increase safety. Pay particular attention to these common maintenance issues.

1. Not keeping the boom clean inside and out. A dirty boom does not shed rain as well and can fail periodic dielectric tests.

2. Cleaning with harsh abrasive cleaners. Abrasives and solvent cleaners are not recommended, as they can scratch or soften the surface coatings. There are a number of cleaners recommended for cleaning fiberglass.
booms or you can use soap and water. Consult the service department of your manufacturer for their recommendations.

3. Washing with high pressure water. This can cause water to diffuse through the fiberglass requiring elevated temperatures or extended time to dry out. Wash by hand and park the boom in a position that allows water to drain. A boom dielectrically tested while it is still wet can cause permanent damage.

4. Surface cracks due to weather, age or improper paint preparation. These kinds of problems will require refinishing. However, refinishing the exterior of the boom without masking the interior can cause paint overspray to settle on the inside. Research has shown that this overspray will trap moisture and prevent water from beading on this rough, sandpaper-like surface. This moisture can then lead to failed dielectric tests.

5. Dielectric testing over 1mA (1000 micro-amps) return current. This process can harm the boom by causing it to burn. If, during your dielectric test, you reach a return current close to 1000 micro-amps, stop the test immediately and examine the boom for a hot spot. Examine the boom for any contamination such as: dirt, moisture, sticks or other debris. Let the boom cool and remove the contamination. (Dirt or moisture can cause the fiberglass to be burnt beyond repair.)

6. Overloading. Even if the boom does not break, overloading can cause stress cracks and shorten the life of the fiberglass boom. A single overload can shorten a boom's service life by months or years. A boom used at the rated load should remain in service for many years.

7. Not strapping down the boom during travel. Subjecting a boom to repeated jolts can shorten the life of the fiberglass. This shock loading will fatigue the fiberglass and can create impact damage in the area of the boom rest.

8. Cable cuts and saw cuts. Cuts can weaken the boom in the specific area of the damage. Consult the manufacturer before repairing this type of damage.

9. Sunshine and ultraviolet radiation. Sunlight and UV can attack an unpainted area, causing the exposed area to look fuzzy as the fibers are exposed. To prevent this problem, repair surface scratches to seal out the sun and moisture.

10. Improper Repairs. Using substandard material and improper repair procedures can cause problems. There are two types of repairs. The first is periodic surface repair that involves the outside coating. Second is the structural repair that involves the boom itself. Structural repair should be referred to the manufacturer for a case-by-case study. Examples of structural damage include: cracks, cuts, delamination and impact damage from tree limbs or tools.

To purchase a copy of ANSI Standard A92.2, call 212-642-4900. Information on boom maintenance provided by Waco Boom Company. For more information, call 254-776-1695.
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Battling Computer Phobia

By Reid Goldsborough

Personal computers today are so widespread, you'd think we were all having one big love affair with the little gray machines. But for every person smitten with the power of the PC, there's another one cowering.

As a stark counterpoint to the enthusiasts who think personal computers are liberating, there are significant numbers who find them oppressive.

Up to 85 percent of us are hesitant about or outright resistant to technology, including PCs, says Larry Rosen, co-author of a new book called TechnoStress: Coping with Technology @Work @Home @Play.

In a telephone interview, Rosen, a professor of psychology at California State University, Dominguez Hills, said it's OK to select which technologies you want to use—which work for you—and to leave the rest alone. But the pressure to be computer literate is enormous. In the office, you might be passed up for a promotion if you can't master how to handle formulas in a spreadsheet. In school, it can take you longer to do your homework if you can't access the Internet or use a word processing program.

Fear can be a formidable foe. Some time ago, when a company I was working for outfitted all the employees in our department with brand new Macintoshes, I tried to help a co-worker get up to speed with his new machine. We had all been through a training program, but he still preferred to have the department secretary type out his handwritten notes than to use the computer himself. The very act of sitting in front of the computer made him uncomfortable. When I showed him how to open and save a file, and had him do the same, sweat beaded up on his brow. Eventually, for his inability to adjust to his altered work environment and for other reasons, he was let go.

Fortunately, there are ways to deal with computer phobia, whether you're experiencing it yourself or know someone else who is.

Perhaps most important, understand that you're not alone in your fear. This is one of the themes in Rosen's book, which he co-wrote with his wife, clinical psychologist Michelle Weil. Knowing you have company here can help you overcome the feeling that you're incompetent, destined to be a slave to the technology rather than a master.

Here are some other points to keep in mind to conquer computer phobia:

- Don't worry. There's little likelihood that you'll break your computer merely by using it—unless of course you throw it out the window. Novices sometimes feel that if they hit the wrong key, the computer will explode. Even if you accidentally delete a particular file, chances are you'll be able to recover it from the original installation disks or backup tapes or by using a specialized program for this purpose.
- Take it easy. When you move on to "productivity" software, consider starting with a "works" program such as Microsoft Works or ClarisWorks. These scaled-down collections of programs can be less intimidating and easier to use than their full-scale cousins, the "suites" such as Microsoft Office and Corel WordPerfect Suite.
- Take it slow. First master simple tasks such as automatic paragraph indenting in a word processing program before moving on to more complex tasks such as mail merge. If you're teaching someone else, don't overload that person at the outset with all that you know. If you're supervising someone in a work setting, don't pressure that person during the learning process to accomplish a specific task by a specific time.
- Forgive, don't forget. You'll make lots of mistakes in the beginning—everybody does. Don't blame yourself or get discouraged. Computers may be easier to use than ever, but there are still procedures to memorize and hand-eye coordination to master. Try to learn from any mistakes that you do make.
- Use a carrot. In a work setting, offer rewards for the successful completion of any training program. Possibilities include "comp" days, a chance to win a home PC or a letter of completion that's filed with personnel and used during performance evaluations. Never threaten that employees will lose their jobs if they don't learn —this will just increase their fear.

Ralph Waldo Emerson once wrote, "Fear always springs from ignorance." The same can be said today about personal computers.

Reid Goldsborough is a columnist for the Philadelphia Inquirer specializing in personal computers and the Internet. He is also the author of Straight Talk About the Information Superhighway. He can be reached at reidgold@voicenet.com or http://www.voicenet.com/~reidgold.
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Long before Rachel Carson's "Silent Spring" sounded the alarm to save the environment, Elizabeth Russell Dean virtually guaranteed the greenscape of Ann Arbor, Mich., a town of 105,000. Just walk the shaded Main Street or dine underneath the canopy on a hot summer evening and it's easy to see the value of her generous gift of trees. Ann Arbor, known mostly for the University of Michigan's sports teams, is a place where people endow chairs, art museums, and even their cats. Dean, however, endowed her family fortune "... to repair, maintain and replace" city-owned maple, oak, sycamore and other trees.

The Greening of Ann Arbor

By Jon Hall

A tree spade is used to plant one of the larger Dean trees.

A view of the Main Street trees along the Elizabeth R. Dean Promenade.
Dean's two-page will, written in 1948, remained unaltered until she died in April 1964—although people tried to get her to change it. Exactly what led this simple, gregarious woman to make her remarkable gift remains unclear, and her will offers no explanation. City Forestry Technician Paul Bairley explains that at her death she lacked heirs; her sister died in 1948.

Certainly, a major influence was close friend Eli Gallup, the city's pioneering forester and parks director from 1919 to 1962. "My father was very good at explaining to people that it was nice to give back to the community," says Al Gallup, his son. "She [Dean] was very concerned. The city's trees were in real trouble."

Indeed, they were. Dutch elm disease was in full swing and crews had their hands full taking down most of the city's 12,000 stately elms. At its peak in 1968, 1,200 diseased elms were removed. As a result of that epidemic, fallen or diseased timber took several years off the life of the city's landfill because of space used to bury them.

The number of trees shading city streets now exceeds 50,000, up from 27,000 at the time of Dean's death in 1964. With the fund's assistance, Ann Arbor annually plants another 500 trees. Elsewhere along major thoroughfares grow larger trees planted by what is now known as the Dean Fund. Still more funded trees grow in city parks. The fund also helps gird against the ravages of urban life, underwriting tree services like deep-root fertilizing, bracing and preventive maintenance.

As one of its first projects, the Elizabeth Russell Dean Promenade removed parking meters along Main Street and added huge, gray, concrete planters into which went expensive, six-inch diameter trees. The result is a linear, urban park in the central business district which, in warmer weather, features a cornucopia of outside restaurants and cafes. In winter, trees glitter at night with thousands of holiday lights creating the illusion of a never-ending festival. In spring and summer, mounds of red, pink and white impatiens and other seasonal flowers, planted by volunteers, push upwards.

A rich green oasis from the air, Ann Arbor now features a center city of taller, earthen-colored brick buildings surrounded by waving canopy of leaves. More than 50 species flourish in the city's habitat, each tracked by a computerized inventory first taken in 1970-71 and updated twice since then. First started by City Forester William Lawrence, the inventory keeps a detailed record on each tree. When he first counted, "It took two people a day to count 100 trees. Now it takes one person a day to count 300 trees. It's been refined over the years." A current project is aimed at documenting every tree in city parks, in addition to those already tracked.

The National Arbor Day Foundation considers being a “tree city” to include spending at least $1 per capita on trees,
Trees, young and old, that have been planted under the auspices of the Dean Fund during its 30 years.

An affordable level for most cities. Ann Arbor likely leads the country, spending more than $10 per person and more than $1 million annually.

At the time of Dean’s death, her estate totaled $1.94 million. The Dean Fund endowment has grown to $1.97 million, in addition to funding more than $3 million in projects during its 30-plus year history. Since then, the city has used the money to nearly double the number of public street trees.

Once the city received the money, city officials debated its use at length. In fact, several years after its receipt, a brouhaha erupted when it was publicized that portions of the money were, in effect, used to underwrite general city operations. Such vehement opposition arose that a joint city-citizen board was created to oversee expenditures. To this day, that board approves all projects. The city used to hold a hearing once a year to solicit suggestions from citizens for projects, but has stopped the process because too few people participated.

“We’ll still take projects from the public,” notes Bailey, “we just don’t hold that meeting any longer.” Instead, city officials propose a list of projects for the board to consider.

Despite the obvious benefits, one wonders why Dean gave the gift. There’s a story about Eli Gallup, told by his son, that perhaps illustrates the atmosphere that shaped Dean’s final wish. In the mid-1930’s, a storm felled a huge elm tree that stood in the city’s Island Park, a slim green area along the Huron River that flows through Ann Arbor. Lacking money but not motivation, Gallup enlisted help from the utility company, a nearby railroad, and volunteers to hoist the tree upright for replanting. It was another 20 years before Dutch elm disease finally felled the tree forever.

“Can you imagine a city crew doing that today,” asks Gallup? “It kind of shows the love he had for trees.” It also may be the best indication of why Ann Arbor’s trees became the only timber in America with their own bank account. Today there’s an Elizabeth R. Dean Memorial Grove planted in a city park named after Gallup.

Jon Hall is a freelance writer and adjunct lecturer at University of Michigan. All photos courtesy of City of Ann Arbor.
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Would You Want a Chain Saw in These Hands?

The dilemma is all too common in the tree care industry: A crew member arrives on the job reeking of alcohol for the third time in a month; a foreman fails a drug test, again; a fight breaks out in the crew. As it turns out, the one who took the first swing was drunk. Company owners know that this is not the kind of behavior they want at the job site. It is dangerous and unprofessional. On the other hand, labor is hard to find in commercial tree care and training is expensive. Besides, the employee may be having a bad time at home or is maybe down on his luck. And he's usually such a nice guy ... it's really going to hurt him if he gets fired. So what do you do?

There are some differences between what you can and what you must do, and those rules vary drastically from state to state. The minimum requirements for any state are the Federal Department of Transportation rules: Any driver who is subject to Commercial Driver’s License rules must participate in random drug testing. An employee who fails a drug test must be suspended from safety-sensitive duty and be referred to a substance abuse professional (SAP), who will evaluate the employee and provide recommendations for treatment, if any. The employee must comply with the SAP’s recommendations, which may include counseling or in-patient treatment.

The employee may return to full duty only when the SAP is satisfied that the employee has complied with treatment recommendations, and the employee has passed a return-to-duty test (blood alcohol levels below 0.02 or a negative drug test result). Once returned to duty, the employee is subject to unannounced follow-up drug and alcohol tests administered by the employer. The SAP will determine the number and frequency of follow-up tests, but there will be no less than six tests in the driver’s first 12 months back to work. These follow-up tests will not go on for more than 60 months after the employee has returned to duty. The SAP may stop follow-up testing at any time he or she deems appropriate after the first six tests. Employers holding CDL’s who drive their own vehicles are also subject to these requirements.

Employees who hold CDL’s are also subject to Reasonable Suspicion testing. Employers must require a drug and alcohol test when observations about the employee’s speech, behavior, appearance and body odor indicate the presence of drugs or alcohol. The determination to require an employee to take a test must be made by an appropriate company official trained to identify symptoms of drug or alcohol abuse. A third party must administer the test. When the employer suspects that an employee is under the influence of drugs or alcohol, he must...
immediately suspend the employee from safety-sensitive duty and make certain a test is administered within two hours of the determination to require the test. If not, the employer must document the reasons why the test wasn’t administered in that time frame. If eight hours pass before the test is administered, the employer must waive the test; however, the employee may not return to safety-sensitive duty until a negative test result is provided or 24 hours have passed since the initial observation, and no further suspicion exists. The employer’s authority to subject employees to reasonable suspicion testing is limited to the hours immediately before, during, or immediately after the employee’s regular work hours.

Employers may not take any disciplinary action against an employee based purely on the suspicion of the presence of drugs or alcohol; however, employers are not prevented from disciplinary action for circumstances other than drug use, as long as they are consistent with the law of the employer’s place of business. In other words, an employee who consistently fails to wear a hard-hat is not protected from disciplinary action or termination for that behavior just because the employer once thought the employee showed up drunk for work.

When faced with substance abusing employees, employers should ask themselves the following questions:

1.) Can I articulate why I think this employee is under the influence of drugs or alcohol? Specific documentation is required by law.
2.) Am I being fair to the employee, myself and other employees?
3.) Am I subjecting my crews or the public to personal danger if I allow this employee to work in this condition?
4.) Am I helping this person by failing to acknowledge the problem? Substance abusers are never helped by denial of the problem.
5.) Do I have a written drug and alcohol policy? Every employer should have one.
6.) Am I treating this employee the same way I would treat every other employee? Discrimination laws do not allow for special treatment of individual employees, whether it is more lenient or more harsh than the treatment of others.
7.) Am I complying with Federal law? It is imperative that employers check state laws and become familiar with them. States always have the prerogative to enforce legislation that is more strict than Federal law.

Taking the time to answer these questions will help employers make reasonable and informed, though often difficult, decisions about drugs, alcohol and employee conduct. Those informed decisions can protect employers from fines, legal ramifications, and, probably, the guilt associated with enforcing the law for employees who fail drug and alcohol tests show up for work under the influence.

Amelia Reinert is deputy executive director of National Arborist Association.
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Removing a Large American Elm

By Oscar P. Stone

The year was 1948. The tree was about 125 feet high and more than eight feet in diameter with a spread of about 100 feet. Electric wires were on the other side of the street. It stood at the side of the road between two driveways, in front of an undertaker’s, so we planned the job when there was nothing going on at the business. A policeman was on hand to direct traffic, and five men were there to handle the branches and wood.

I climbed the tree and cut off the top branches, which measured about 20 feet long. These branches just had a half-inch tag line to keep them from falling on the wires when they reached the ground. After the traffic stopped, I cut off one limb. As it started down, a car pulled out of line and came toward the falling branch. From up in the tree, it looked like the car would be hit by the limb, since tag line was not strong enough to stop the branch from reaching the ground. At the last minute, the car stopped and the branch hit the road just in front. The policeman was very mad at the driver, the local health officer, who thought he was not required to wait in line. The policeman made him wait for all the other cars to go (while giving him a very hard time.)

After we had topped off the tree at about 60 feet, we dropped the remainder across the front lawn. It landed on a pile of snow at the side of the driveway about eight to ten feet deep. As the snow flew from the falling tree, I thought we would break some windows. We were lucky the snow only hit the building, missing the windows.

We had a Dodge Power Wagon with a winch and one of the first power saws ever made. A Disston saw that had been developed for the army during World War II, it weighed 135 pounds. We were using an eight-foot blade on the saw, but had to notch the trunk of the tree on both sides to make the felling cut. The saw had scurf teeth that were like crosscut saw teeth. When you sharpened the teeth, you had to have a wrench to set them.

As you can see from the photo, doing tree work back then required bull strength and a strong back.

Oscar P. Stone is a horticulture consultant in Marlboro, Vermont.

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