

## **Selling Air** **by Dave Leonard**

Since 1998 I have been selling air to my customers. The Supersonic Air Knife opened a whole new way to care for trees, provided new markets and taught me a great respect for the importance of the tree underground. In this article I want to tell you how you can add this new market to your business, how air tools work, and why they can improve the health of trees.

The Supersonic Air Knife was developed in 1970 for locating underground utilities, specifically gas lines, and to make line repair easier and safer. Rob Gross, a California arborist, was experimenting with both air and high-pressure water for soil excavation and compaction remediation when Dr. Gary Watson of Morton Arboretum directed me to him in 1998. Since then arborists have developed many ways the supersonic air tools can benefit arboriculture.

The Supersonic Air Knife has been redesigned and patented by Tom Hursen of Pittsburgh PA from its earlier 22 lb. weight into a high strength aluminum tool weighing in at 5.5 lbs. With requests from many clients for adaptations, the Supersonic Air Knife family has grown to include several versions of the tool and a supersonic vacuum as well.



**Radial Trenching in Mobile. AL**

### **What is it?**

The tool is essentially a high strength aluminum tube and nozzle with an air valve powered by a tow-behind air compressor. The primary key to its function is the nozzle that accelerates the air to approximately twice the speed of sound (about 2,200 fps.). This high velocity air penetrates the ground to a depth of about a foot, creating a momentary cavity in which the dirt is crumbled. If the Supersonic Air Knife barrel is inclined away

from the user, the soil can be blasted out of the ground to a depth of one to two feet, depending upon soil type and technique. The air penetrates the pore space around the soil particles, loosening and moving the soil. Since buried pipes, cables and tree roots are not porous, the soil is moved from around them and they are not damaged.

### **How does it help trees?**

Why move soil with air when we already have shovels? It is easier, quicker, and less damaging to underground structures (including roots). But air tools can do much more than uncover a girdling root without damage. The relationship between air and roots is regrettably unappreciated by most arborists.

Many understand that plants use carbon dioxide, sunlight, and water during photosynthesis to produce carbohydrates and oxygen, but they don't realize that plants also need oxygen for basic life processes. Respiration is the process by which the carbohydrates and organic compounds in the plant are broken down to release stored energy to fuel its life processes. Respiration occurs not only in leaves but in root growing points (as well as cambium, developing fruit and shoots). Oxygen is needed for respiration. Respiration occurs in every living cell in the tree.

Oxygen levels in the soil below 10% greatly reduce root respiration, thereby limiting root growth and activity. Oxygen levels less than 3% will kill roots. Inadequate soil aeration is one of the most seriously limiting factors in growing plants in the landscape. Roots also need pore spaces in soils so that they can initiate new growth. A heavily compacted soil inhibits root growth through higher bulk density by physically not allowing roots to grow. Contrary to popular belief, roots cannot break their way through solid objects, they need existing spaces to grow.

Additionally, roots need pore spaces (macropores) to allow gaseous exchange. This is the process by which roots use the available oxygen in respiration which produces carbon dioxide as a waste product. Pore spaces provide the oxygen and allow the carbon dioxide to escape. Compacted soils with little or no pore spaces cannot provide oxygen/CO<sub>2</sub> exchange, cannot drain away or absorb water, and cannot support root growth. Seriously compacted soil can become anaerobic and will kill trees.

### **How do you use it?**

Soil decompaction or soil remediation is the number one service you are selling your client when you sell them air. An air tool is ideal for vertical mulching, radial trenching, performing root collar excavations and generally loosening soil and improving soil (air tilling). I try to persuade my clients to let me loosen all of the soil out to the dripline of the tree, to a depth of six to twelve inches. A tree with a root depth of six inches in heavily compacted soil could have its root zone volume doubled by decompacting the soil 12 inches deep. So far, we have not destabilized any trees. We like to incorporate soil amendments at this time if needed.



**Air Tilling on Historic Tree**

You may want to break up your aeration into smaller areas under the crown if you are concerned about loosening the soil too much and causing destabilization. Radial trenching with an air tool is much more beneficial than using a trencher because you don't cut any roots or glaze the sides of the trenches. Vertical mulching can be done with the same tool instead of bringing in an auger. It is much easier on your worker's back and faster as well. We have found that combinations of radial trenching and vertical mulching can be used to minimize turf damage for your turf manic clients. I still use the forest as the best model for tree health. It has healthy trees, good soil porosity, and no grass!

Root collar excavation is another important service that has not been fully explored. In my experience of excavating over 10,000 root collars, I have seen that almost every tree planted by man has a malformed root system. Add to that any tree that has been impacted by construction, and you are dealing with almost all urban trees. Exposing the root collar gives access to girdling and encircling roots that need removal. It also allows correction of planting mistakes such as leaving synthetic burlap or wire baskets on root balls.



**Root Collar Excavation Before and After**

I have also found that the majority of trees are being planted too deep. This does not allow adequate oxygen to be available to the roots. My air tools allow me to remove

excess soil and aerate the area to encourage more root growth. It is also great for eradicating the ubiquitous mulch volcanoes that both homeowners and landscape maintenance firms seem to love.

Trees and utilities have a troubled relationship both above and below ground. Air tools can improve the second half of that conflict. You can use them for their initial purpose – to locate utilities before planting or construction. Calling 811 doesn't cover all underground utilities. You can minimize root damage by delineating the areas for construction easements and clean cutting roots, rather than ripping them up with a backhoe. They are great for excavating trenches and leaving roots intact, allowing contractors to install wiring or irrigation pipe without harming roots.

Formulas for tree protection zones are great for engineers and landscape architects but I haven't found a tree yet that can read those plans. It's hard to argue that "roots aren't growing there" when you can expose them. Installation of irrigation lines and lighting cables can be accomplished without cutting roots. The underground cable of lightning protection systems can also be installed in this manner.

The newest use of air tools has been in planting and transplanting. Given the right kind of soils, trees can be bare-rooted with an air tool and transplanted without the weight of a root ball. Even with heavy clay soils, you can prepare the perfect planting site with an air tool, loosening the soil and digging the hole all at the same time. We have cut our installation time in half with the advent of the Supersonic Air Knife.

### **How do you sell it?**

Now that I have convinced you that the air tool can be useful to your business, how do you sell that air to your clients? If you are already marketing Plant Health Care your clients will know your goal is to keep their trees as healthy as possible. Preserving trees gives you an on-going customer. Cutting trees down is a one-time operation.

I carry a soil penetrometer and soil probe on my first visit to a client's home. When diagnosing their tree problems, I explain that 85 to 90% of visible tree problems originate below ground. I invite him/her to use the penetrometer or soil probe in various places around the yard. Inevitably the soil is very compacted. That allows me to link the problem they see above ground to what they can't see under ground. The real selling point will be the condition of their trees after treatment. You will see better color and improved growth – and a happy customer. Air tilling an area around their troubled tree and mulching it appropriately can make a huge difference by eliminating the compacted soil.

If clients are reluctant to buy into the entire prescription of air tilling and mulching out to the drip line, you can approach the project incrementally. Air tilling a six-foot radius circle around a six-inch caliper tree will have more benefit than a six-foot radius circle around a 24-inch tree. Some clients don't want a 20-foot radius mulch circle around their tree, even though it would greatly benefit the tree. They prefer their turf. Many are turf addicts. Larger trees might receive vertical mulching between the air tilled area and the

drip line. I like to vertical mulch 12 to 18 inches deep on two-foot centers and back fill the holes with a biochar/compost mixture. I have also been successful in selling air tilling around a tree in a smaller radius the first year and expanding the area in subsequent years.

Many landscapers use the Supersonic Air Knife when planting shrubbery or understory plants within the root system of existing trees. This can eliminate root damage from spades or augers.

Much more attention is now being paid to the structure and functions of trees below ground in large part because the Supersonic Air Knife has enabled researchers to readily examine this frontier as never before.

### **How do I price it?**

Before you can develop a pricing structure for your air tool work you will need to practice with the tool in all the types of soil you have in your area. Soils vary considerably in strength, density, moisture, etc. Try it on dry soils and on those that have been irrigated to find the amount of moisture that provides the most efficient work environment.

This tool will work effectively with all soils, but the effectiveness can vary significantly, particularly with soil moisture. Excavating hard clays and other very hard soils will be slow during the first several inches of depth and will produce increased scatter. But somewhat deeper, where the soil has usually retained greater moisture, the scatter will reduce, and the excavation rate will improve. The use of guards can help to keep the soil close and irrigation prior to the excavation may help.

Excessively dry soils will not excavate well and will throw a lot of dust. They need to be irrigated a few days prior to excavation. The operator should also hold the bottom of the barrel directly on the ground and move it quickly over the area being excavated. The tool will crumble the dirt as rapidly as the operator moves the tool. Holding the end of the barrel above the ground reduces digging effectiveness. Frozen soil is also impossible to work.

After some practice you should be as accurate in predicting the time required for air work as you are for pruning jobs. I consider air work as a “specialty” that is entitled to a higher hourly rate than routine tree work. Given local economics considerations, it may be appropriate to increase your hourly rate by 25% - 100% for these services. Some arborists charge a flat rate per tree.

The cost of a Supersonic Air Knife can be similar to a professional chain saw. You will also need to rent an air compressor. As your air business expands you will probably want to buy a compressor. I found that we used the tool a lot more after we bought our first compressor. Used air compressors are readily available and provide good service.

### **Conclusions**

By incorporating the use of supersonic air technology in your business, you can increase the level of tree care you offer your clientele. What could be better than ensuring the survival of urban trees while increasing your bottom line? I have exhibited the tool and done workshops from California to Boston and from Minnesota to Florida and Louisiana. The tools are also in use in Hawaii and Alaska and several countries.

I am scheduled to be at a number of virtual conferences this year, either exhibiting the tool or making presentations. I hope to see you there! If selling air seems like a good addition to your business, I invite you to look me up, give me a call or visit my website: [www.dlarborist.com](http://www.dlarborist.com), 859-509-3150.

Thanks for your attention!

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