



## Staking and Guying Newly Planted Trees

Staking newly planted trees is a common practice, but it is not always necessary. Staking often has detrimental effects on tree development and growth:

- If a single stake is used, the trunk may grow larger above the tie than below, and the tree may bend away from the stake.
- The trunks of staked trees are narrower at the base than those of unstaked trees that stand alone and are free to move.
- Staked trees develop a smaller root system and grow taller.
- Staked trees are subject to breaking because the top is not free to bend and offers more wind resistance.
- Staked trees are sometimes unable to stand upright when stakes are removed because the trunk is weak.
- Staking materials often cause injury and girdling from rubbing.
- Tree ties can injure the bark, restrict movement of water and nutrients, and cause uneven development of transport vessels in the bark.
- Staking and guying are expensive, time-consuming, detract from tree and landscape appearance, and require follow-up maintenance.

Most shrubs and trees with limbs close to the ground will not require staking for stability or protection. Low branches keep people and equipment away from the trunk. Relatively short and sturdy trees are usually able to stand on their own.

With all of these negatives, why would anyone want to stake a tree? In many situations, staking for a short time is critical to establishing the tree. Trees may require support to hold them upright until

they become established, especially when very tall in relation to the container or root ball, or when planted on windy sites or in sandy soils. Some trees have weak trunks if spaced too close together in containers or in field nurseries. In such conditions as these, trees often must have support—at least initially after planting.

In public or high-traffic areas, staking also may be helpful to protect young trees from damage by mechanical equipment or vandalism.

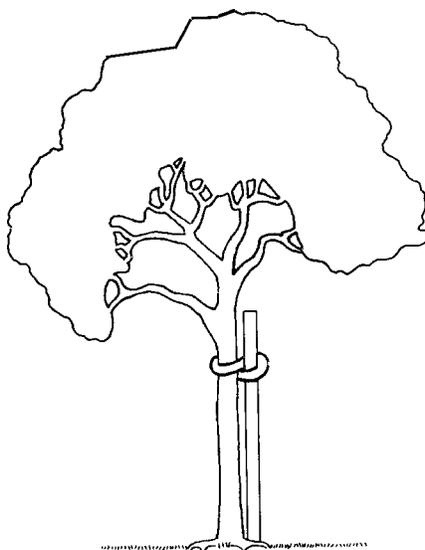
Guying is used instead of staking to ensure stability for the establishing root system of transplanted trees with a large trunk diameter (greater than 4 inches),

Staking and guying will not damage trees *if done correctly*. Correct staking or guying means using the proper number of stakes or guy lines for the job, selecting the right materials, and installing the system in the right place with the most effective and least damaging tying technique. The most important point to remember is that the system *must be removed promptly*—as soon as it is no longer necessary.

### Staking for support

Trees with trunks that are not strong enough to stand without support or to return upright after a wind require staking. The top of the support should be about 6 inches above the lowest level at which the trunk can be held *and* have the top return to upright when it is bent. Determine this height by holding the trunk and gently bending the top. Place the tie (the loop around the trunk) 6 inches above this point. Stakes should extend no more than 2–3 inches above the top ties to reduce the chance of rubbing.

One, two, or three stakes may be used to support the tree. Materials commonly used for stakes are



wooden lumber (2 x 2 inch), wooden poles, metal pipe, metal fence posts (T-bars), and rebar. To attach the tree to the stakes, use a broad, smooth, somewhat elastic material to minimize damage to the tree trunk. Common tie materials include belting, elastic webbing, polyethylene tape, tire cording with wire ties, and wire covered with rubber hose or tubing. There are also a number of commercial devices available. *Never* use baling wire, rope, string, fishing line, or covered electrical wire.

Single stakes should be positioned on the upwind side of the tree. Tie a figure-eight loop between the stake and the tree for flexibility. Several ties along the trunk can be used, but one is sufficient for small landscape trees. Do not attach the stake to the tree too rigidly, because this will result in a weak root system and increased chance of the tree being girdled or breaking. Leave some slack—trees need to be allowed to move or sway somewhat. Do not allow a single stake placed close to the trunk to shade the trunk; this can cause uneven growth of the cells in the trunk's outer layer, so that the trunk actually tries to grow away from the stake.

Using two stakes is often preferable to a single stake. A single, flexible tie at the top of each stake is sufficient for support and allows movement of the trunk. In moderate to strong wind conditions, place the stakes so that an imaginary line drawn between them is at right angles to the most critical wind direction. A low tie placed between the stakes on the downwind side provides additional stability.

Some landscape contractors, arborists, and gardeners use three or four stakes to provide greater wind protection and protect the trunk from equipment and people. When using multiple stakes or guys, space supports equally around the perimeter of the tree.

### Anchor staking

Trees that are otherwise upright and strong may require anchor staking to keep the root ball from moving until new roots grow into the surrounding soil and provide support for the tree. Anchor staking holds the roots or root ball of trees in place during establishment. Trees planted on sites with uncompacted, loose fill require staking to anchor them until they are established. Trees with large, unthinned canopies will not be able to stand alone when planted. Some overgrown container-grown trees and large field-harvested trees with only a small part of

their root system attached do not have enough of a root system to physically support the top at planting time.

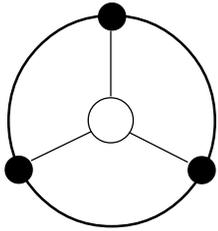
Low staking with two or three short stakes helps keep the lower trunk from moving while allowing freedom of movement at the top of the tree. The stakes should be sturdy and be driven about 18 inches into the ground. Tie each stake to the trunk with a loop or figure-eight tie and secure the tie near the top of each stake. Allow some flexing of the tree without allowing movement of the roots or rubbing of the stakes against the trunk.

### Protective staking

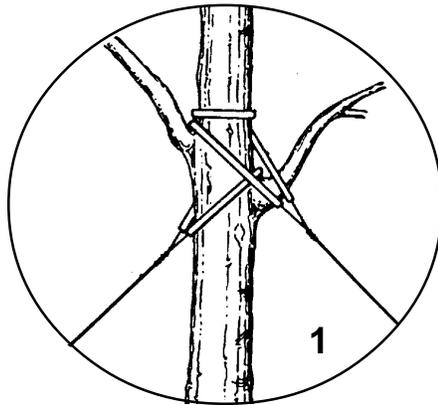
Staking is sometimes used to keep vehicles, mowing equipment, and people away from young trees, even if they are able to stand alone. This is often done for trees planted in heavily used streets, parks, and other public places. To protect trees from equipment only, two or three short (approximately 4 ft long), sturdy stakes may be driven into the ground around the tree. Place the stakes about 15 inches apart, leaving about 30 inches protruding above ground. Make sure that the stakes are highly visible, so that people will not walk into them. Consider painting them white or using reflective tape or marking ribbon to alert people. Do not attach the stakes to the tree. To help discourage vandals, sturdy stakes encircled with heavy wire or metal grillwork may be necessary. It is important to design such staking so that top movement of the tree is unrestricted and the staking is not rubbing the tree.

### Guying

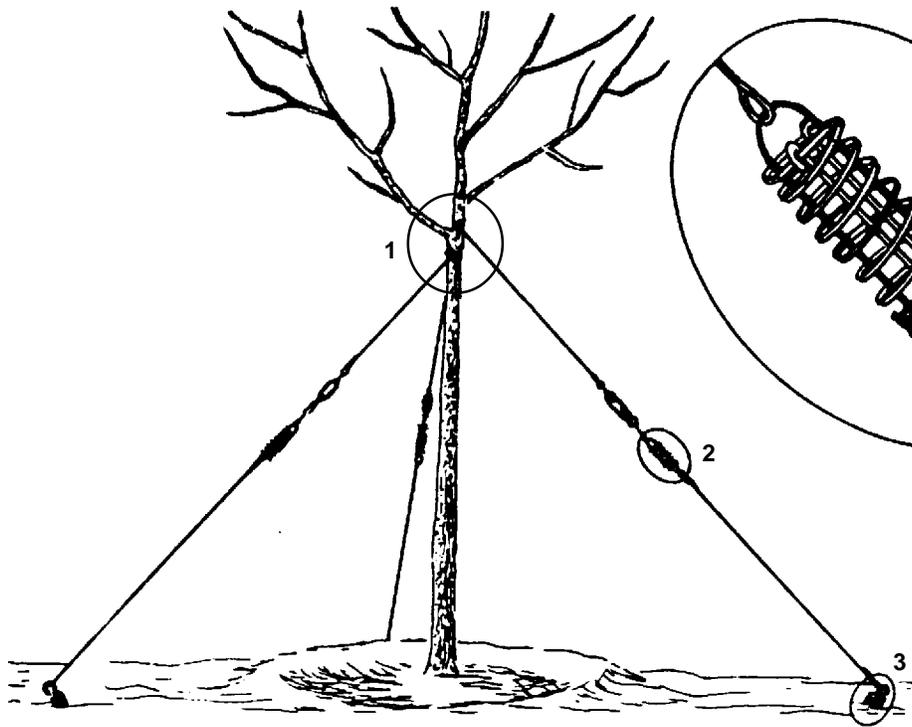
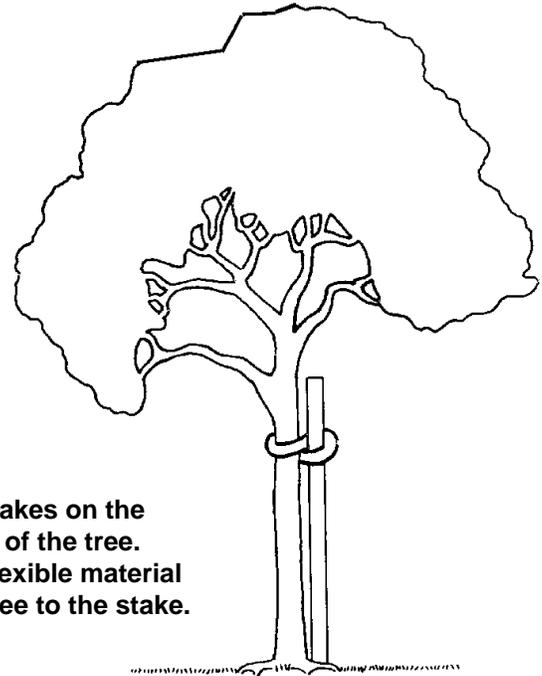
Guy wires are often used to anchor trees with trunks greater than 4 inches in diameter. Guying uses three or four wires attached to the tree and anchored into the ground. Anchors may be wooden or metal stakes, land anchors, or "deadman" (a wooden beam or concrete block placed 2–3 ft below the soil surface). Although stakes are the most common and least expensive anchor, they can loosen or pull out of the ground and should be checked frequently for stability. Pass guy wires through a section of hose or protective material to protect the tree, and then pass them around the tree at crotches. Some professionals install a turnbuckle for easy adjustment or springs to allow natural flexing. Twist wires to tie them off. As with staking, do not tie guy wires tightly around the tree, as this causes girdling of the trunk. Mark guy wires with streamers to warn people of their presence.



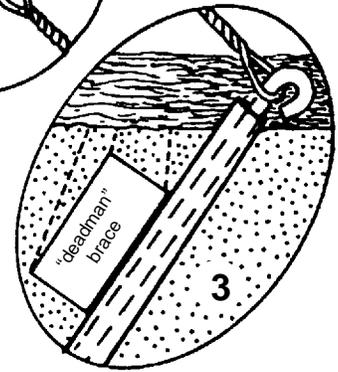
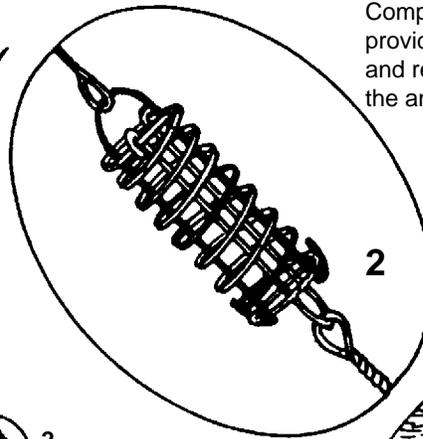
Space stakes or guys evenly around the tree's perimeter.



Place single stakes on the windward side of the tree. Use a broad, flexible material to attach the tree to the stake.



Compression springs provide some flexibility and reduce strain on the anchor stakes.



**Guying large trees provides stability until roots grow into the soil.**

From R.A. Harris, A.T. Leiser, and W.B. Davis, 1976, *Staking landscape trees*. Univ. Calif. Agr. Ext. Leaflet 2576.

In turf, guy wires can be attached to removable pins inserted into galvanized pipe set flush with the soil surface.

### Follow-up care

While the support system is in place, check it often for broken wires and ties, stakes rubbing on the tree, deterioration of ties and covers, or other problems. Guy wire tension and ties may need adjustment, and anchors may need re-setting. Replace loose or pulled stakes immediately.

Staking and guying systems must be checked and adjusted frequently to be certain that they are not causing tree damage. Remove them as soon as possible. Chances of girdling and injury increase with the length of time a tree is staked or guyed. Make sure all planting contracts include removal of staking and guys.

*Remove stakes or guy wires after one growing season.* Never leave them on a tree for more than one year.

Almost every physiological response of a tree to staking or guying delays its becoming strong. Support systems are a last-resort effort to keep a tree upright until it can stand alone. *The sooner a tree can stand alone, the sooner it will become established and strong.*

Analyze conditions and trees carefully before deciding to stake or guy. Use staking and guying systems only when absolutely necessary, and for the shortest time possible. When support is a must, use proper methods and techniques, and remove it promptly. By using discretion and good judgment in providing support to transplanted trees, you can encourage strong growth and healthy trees.

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