

## Preventing Construction Damage to Trees Bruce R. Fraedrich, PhD, Plant Pathology

The presence of trees surrounding a residence contributes greatly to both the aesthetic and monetary value of the home site. Studies have shown the presence of established trees usually increases the value of a building lot by 10% and sometimes as much as 25% over a similar lot lacking trees.

Most homeowners recognize trees provide many benefits including beautifying a residence, providing shade, noise abatement, privacy, and reducing home energy costs. Most progressive homebuilders also recognize the value of trees and usually leave as many as possible on newly constructed home sites. Unfortunately, trees often are damaged so severely during construction that many die following development.

The loss of the trees not only reduces the value of the house but also adds considerable costs to a new home due to tree removal or hazard reduction pruning. Healthy trees can be maintained on new home sites if they are carefully selected and some basic precautions are undertaken to prevent damage during construction.

### Types of Construction Damage

Tree decline and mortality around newly constructed homes occur primarily from damage caused to the root system. During construction, roots are frequently cut when installing foundations, water and sewer lines, driveways, and sidewalks. Roots are also lost when soil is removed during grading (Figure 1). Fine (absorption) roots occur primarily within the top six to eight inches of soil, and removing just a few inches of soil during grading can significantly impact water and nutrient absorption. Cutting large roots increases the likelihood of wind-throw especially during storms. This may also lead to structural decay of support roots and the lower stem tissues that can cause tree failure years after construction.

Compaction of the soil or placing fill over a tree root system during grading is equally as destructive as cutting and removing roots. All plant cells, including those in the roots, require oxygen to survive. Root cells obtain oxygen from pores within the soil. When the soil is compacted or fill is added during grading, pore space is greatly reduced resulting in root mortality and tree decline.

**Figure 1: Declining oak (left) following grading during house construction**



Mechanical injuries to the stem and limbs also contribute to tree decline. Bark injuries inhibit transport of water and nutrients to the crown and allow entrance of decay and other disease organisms.

## Tree Selection

The initial selection of trees chosen to remain on a building lot is one of the most important considerations for ensuring tree survival. A competent arborist together with the builder should undertake the tree selection together. Each tree should be considered individually before a decision is made to save it or not. Factors to consider in evaluating a tree are its location in relationship to construction activities, species, age and condition.

### Location

Trees to be saved should allow adequate access to the lot for construction equipment and should fit into the landscape after the house is built. Trees extremely close to the house should not remain. Severe root damage usually occurs when digging foundations and these trees often become a nuisance after the house is completed. Leave deciduous trees on the south-southwest side of the house whenever possible. This will reduce energy costs by shading the house from hot, summer sun but will allow rays to penetrate in autumn and winter after the leaves have fallen. Trees that will screen the house from winds, noise pollution, or objectionable views should be left, if possible.

### Species

Tree species that are inherently deep-rooted including oak, hickory and ash, usually withstand site changes better than surface-rooted trees such as dogwood, most conifers and certain maples. Select only those species with strong wood and good branching habits when leaving trees close to the house. Favor species that are relatively pest-free. Elm, for example, is a beautiful shade tree that tolerates extreme site changes; however, the species is subject to a lethal vascular disease limiting its usefulness as a landscape tree. A diversity of species should be left whenever possible.

### Age and Condition

There is a tendency to save the largest and oldest trees on the lot since these are most prominent and attractive to the home-buyer. However, mature trees are much less adaptable to site changes

occurring during construction. Young, vigorously growing trees should be favored as much as possible. Choose only healthy trees free of trunk decay, severe injuries, and pest damage.

## Preventing Construction Damage

### Root Damage

Reducing root damage is the key to preventing tree decline and death after building construction. Physical barriers such as fencing should be erected around trees to prevent encroachment by construction equipment (Figure 2). This will minimize soil compaction and also prevent fill and other debris from being placed over the root system. Location of the barrier must be decided by the arborist based on the species, size and condition of the tree.

If construction equipment must pass close to the tree, a bridge can be constructed over the root system. This is done by placing a steel plate over railroad ties, placed at intervals along the ground as supports.

**Figure 2: Construction barriers installed to reduce damage to roots and soil**



### Grade Changes

Grade changes around trees should be avoided whenever possible. If fill must be placed over the root system of a tree, construction of a tree well will help minimize the impact of the fill. If the grade must be cut, this should be done outside the critical root zone.

### Pruning

Prior to the initiation of construction, prune any interfering lower limbs on trees to be preserved to

allow access for construction equipment. Large dead branches also should be removed at this time in order to eliminate a possible safety hazard to construction workers.

## After Construction

### Soil Treatments

After construction is complete, trees and new plantings should be fertilized and any necessary amendments applied based on soil analysis. If soils have been disturbed within the critical root zone, Bartlett's Root Invigoration should be considered to alleviate soil compaction, introduce organic amendments and ensure a desirable rooting environment. Mulching the critical root zone appropriately is also key to promoting root development and health. Apply two-to-four inches of organic mulch beneath the canopy of the plants, keeping it off of the root flare at the base of the stem.

### Bark Wounds

All bark wounds should be traced back to live tissue and the dead tissue removed. Do not enlarge the wounds by removing living tissue. If wound wood ("callus") is present on the margins of the wound, no further treatment is needed.

### Irrigation

Apply supplemental irrigation during dry periods to compensate for any root loss or damage to soil within the critical root zone. Water should be applied by drip irrigation to maintain soil moisture in the upper twelve inches of soil.

### Pest Management

Trees weakened due to construction are more susceptible to secondary insect pests and disease agents. Insect borers, bark beetles, and canker and root disease organisms commonly invade stressed trees. Monitor trees routinely during and after construction for pest outbreaks and general plant health and apply appropriate treatments as needed to maintain health.



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