

## People can protect trees amid construction environments

Despite hazards, tree-damaging equipment and terrain alterations, precautions are available to help trees survive the turmoil.

By Patti Erwin, Urban Forestry Coordinator, Arkansas Forestry Commission

**F**ew things in our lives contribute more to the quality of life than the management of our natural resources. Air quality, clean water, community beautification, wildlife and property values derive from the planting and caring of trees in our communities.

Trees are important to our communities' economic and environmental health. Trees attract businesses, residents and tourists.

Trees mitigate the problems that we cause in pollution, erosion and heat buildup. Trees are a valuable resource, a good investment.

So why do people kill them? People commonly do not understand the structure of the tree nor the response that trees have to their environment.

As our communities grow, rural land is converted into development. Buildings, utilities and road construction are the most frequent causes of tree injury.

### How does construction affect on-site trees?

Obvious damage to trees is on the branches and trunk.

Branches commonly grow low to the ground; unless they are pruned, heavy equipment will tear them from the trunk or break them off.

Root damage can also be visible.

*To preserve this tree, the water pipeline is being routed under the root system. Other utilities and cuts for a driveway and sidewalk will challenge the tree. Photo courtesy of the Arkansas Forestry Commission.*

- When the subgrade for roads and buildings is prepared, the organic surface soil is stripped.
- The grade often is lowered, and the root system goes too. Removing anchor and feeding roots can lead to potential hazards.
- Excavation for footings, walls and foundations can remove root systems.
- Trenching for utilities and drainage cut the root system.
- Loading sand, soil, gravel and other construction materials with a backhoe over the root system eventually suffocates the roots.

Reductions in grade can also affect the tree by lowering the water table and making less water available to the root system.

### Dying tree may not be noticeable for years.

Soil compaction, however, likely is the least noticed and worst impact on trees at the time of construction.

Soil compaction changes the soil properties—decreased soil pore space and oxygen and increased carbon dioxide and water runoff. Soil compaction is like laying asphalt.

Water and air cannot move as well through the compacted soil to reach the roots; root growth becomes limited. Gas exchange cannot occur.

When a tree dies from soil compaction, it is slow, and its dying may be unnoticeable for years. Suffocating the roots with too much soil can create the same symptoms. Four inches of soil, especially with clay, over the root system of a sensitive tree, such as a dogwood or post oak, can kill the tree.

A boundary is created between the two layers of soil. Water will often sit between these layers and slowly fill all the air spaces. It can also prevent gases from moving out of the ground.

A tree's exposure to the elements is another type of construction damage to trees. Trees that have been growing in groves and then are exposed to full sun, wind and heat from parking lots and buildings cannot always survive the shock, and they will slowly decline.

### How can damage be minimized?

A good plan is the best defense.

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# Urban Forestry

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- Inventory the trees
- In what condition are the trees?
- What species are they?
- Do hazardous trees need removal?
- Map the root zone. The drip line is the easiest measurement to use, although it's not 100 percent accurate.
  - Lay the blueprint over the root zone—note the trees that will have the most impact and should be removed.
  - Prepare a conservation plan to include construction specifications.
    - Note utilities; tunnel under trees where rerouting is not feasible.
    - Prune roots where disturbance will occur.
    - Detail parking areas for construction workers (everyone wants to park under trees in the summer).
    - Determine an area for concrete washout to avoid leaving leftover mix on the roots.

## Protect saved trees on construction site.

- Prune lower branches near construction traffic.
- Install orange fencing at the drip line; add signs.
- Place mulch or plywood over root zones where traffic will go to spread the weight and reduce compaction.
  - Use sprinklers for trees in dry weather.
  - Install tree wells where the grade is raised. Wells prevent the soil from touching the trunk and reducing moisture buildup.
    - Include an aeration system to alleviate root suffocation and to allow air and water movement.
    - When the grade is lowered, terracing the soil and using retaining walls can help save the root system and the tree.

After construction is complete, the trees' survival chances improve with aerated soil.

Soil does get compacted, it seems, regardless of the precautions.

Here is how to aerate the soil. Drill two-inch diameter holes in the soil to a depth of 12 to 18 inches, starting approximately three feet away from the trunk; circle the tree at the drip line. Top the area with compost or sand.

Tree preservation is possible on a construction site. If construction participants know the needs of the trees and the construction effects on the trees, then they may have a greater respect for tree preservation.

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