MINNESOTA TREE LINE
Agricultural Extension Service
University of Minnesota

Protecting Shade Trees from Construction Damage

No. 21—1978
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Nearly everyone recognizes the value of trees in providing shade, ornament, or protection to building sites, city streets, and roadsides. All too frequently, however, the trees that make a site attractive are damaged or killed during construction work by carelessness or inadequate protection. Frequently, it is possible to repair such damage or to restore a tree's health, but it is always better and usually more economical to prevent damage than to correct it. Before beginning actual construction, it is worthwhile to give careful thought to the protection of trees on the site.

This fact sheet provides guidelines for diagnosing construction damage and illustrates various methods of preventing or lessening damage to shade trees from construction work. The information was adopted for use in Minnesota from the University of Illinois Cooperative Extension Service Circular 1061, "Tree Damage Around Construction Sites."

DIAGNOSING CONSTRUCTION DAMAGE

Symptoms of construction damage to trees appear over a period of several months to several years after the damage occurs. Because of this delay, people often shift the blame for damage to other causes, and it becomes too late to effectively treat the trees.

The first symptoms are usually just a slight wilting and shedding of some leaves at the time of construction. Then, in later years, leaf dwarfing, dying of twigs, and, in the case of conifers, excessive dropping of needles occurs. Trees damaged by construction act abnormally in many other ways, most noticeably by dropping leaves earlier in the fall than trees of the same species in other locations. Early fall coloring usually accompanies early leaf losses. In cases of severe construction damage, off-seasoning blooming occurs, and this usually means the tree is about to die.

In addition to noticeable physiological change in trees, construction damage produces other symptoms. If the tree has been only slightly damaged, growth is slowed and resistance to insects and diseases is weakened.

Diagnosing compaction or smothering damage can be difficult because it takes quite a while for symptoms to appear. Trees sometimes die five to seven years after the original damage. The amount of damage, the species of tree involved, and the soil type will determine how long it will take symptoms to appear. Some species, burr oak and cottonwood for example, have deep roots and this gives them the ability to survive for long periods in compacted soils that do not have enough air to support other species.

PREVENTING CONSTRUCTION DAMAGE

Controlling traffic. A basic way to lessen construction damage to trees is to reduce traffic as much as possible around the construction site. Talk this over with your contractor before construction begins. Establish definite traffic patterns and fence off trees, if necessary. Locate areas where soil and building materials are stockpiled well away from the drip line of the trees you want to save.

Caring for tree roots. When you install temporary or permanent driveways or traffic lanes, cut nearby tree roots cleanly. Cleanly cut roots will heal well, and new roots will develop. Trenchers and backhoe equipment are most commonly used for such cutting (figure 1).

Bridging. Sometimes it is necessary for traffic to pass near the trees. In this case, use bridging as illustrated in figure 2.

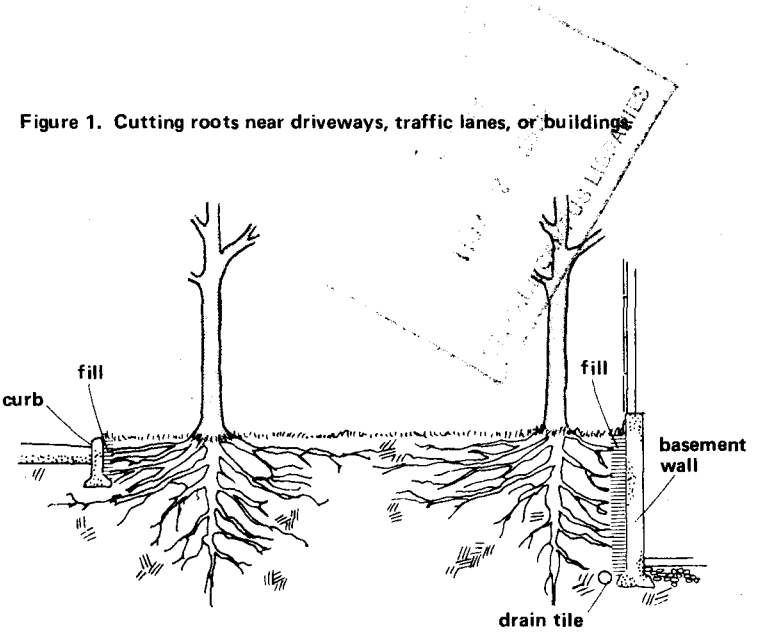

Figure 1. Cutting roots near driveways, traffic lanes, or buildings.

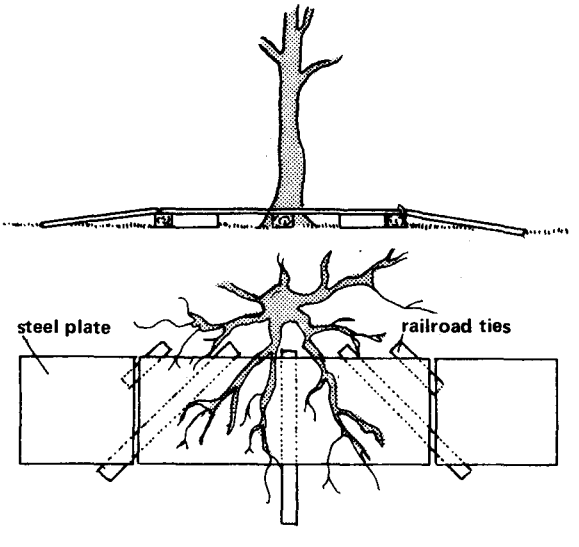

Figure 2. Using bridges to protect tree roots.

Watering. Trees that have lost some roots and are in compacted soil usually need water.

Pruning. When you have pruned a tree's roots you should also remove a comparable portion of the top part of the tree. Do not pollard, that is, cut back the top branches close to the trunk. Remove selected branches to the main trunk or to the crotch. Cut branches from throughout the tree to maintain symmetry.

Cutting and filling. Cut-and-fill damage can injure trees just as much as compaction. The symptoms of the two problems are almost identical, only in most cases, injury and death occur more rapidly from cut-and-fill damage. Figures 3, 6, and 7 illustrate three of the most common types of cut-and-fill damage. Figures 4, 5, 6, and 7 indicate the proper treatment in each case. Fill that covers the root system of a tree will smother it by cutting off the air supply and, sometimes, the moisture that the tree must have to survive.

If you want to place fill dirt over root systems, follow the procedure in figures 4 and 5. Use the complete system for satisfactory results, since installing any one part of it will do little good. Use 4- or 6-inch standard agricultural field drain tile. Lay it in the pattern illustrated in figures 4 and 5. Cover the tile with 6 to 8 inches of coarse ½- to 3-inch stone. Use creek gravel, not crushed limestone which is commonly used for road work. Crushed limestone will harm the tree by raising the soil pH. The fill soil should be as porous as possible or amended with sand or organic materials such as corncobs. Sandy soil permits much more natural drainage of air and water than clay, which packs more easily. Two or three inches of sandy soil can be filled over a root system without harming the tree, while 2 to 3 inches of clay soil filled over a root system will kill the tree.

Remember, there are no shortcuts to good protection. You may save time and avoid mistakes if you obtain competent assistance before you make plans for extensive or complex construction operations or before you treat trees that have suffered from widespread construction damage. Sometimes it may be desirable to consult local urban foresters, landscape architects, arborists, or other technical experts.

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Figure 3. Cut-and-fill damage.

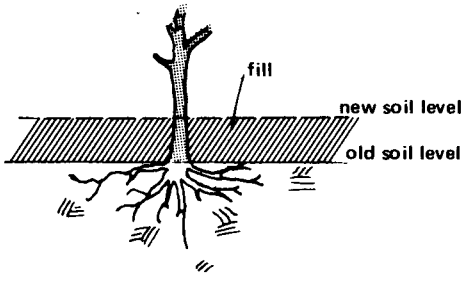

Figure 4. Proper tiling system for raising ground level around tree.

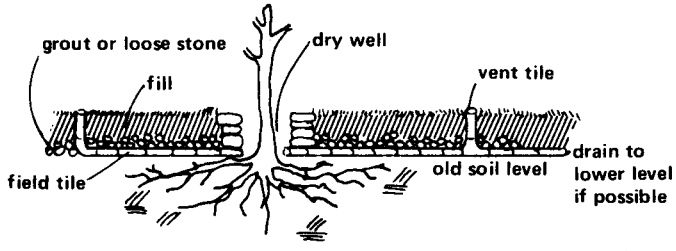

Figure 5. Drainage system when raising ground level (top view).

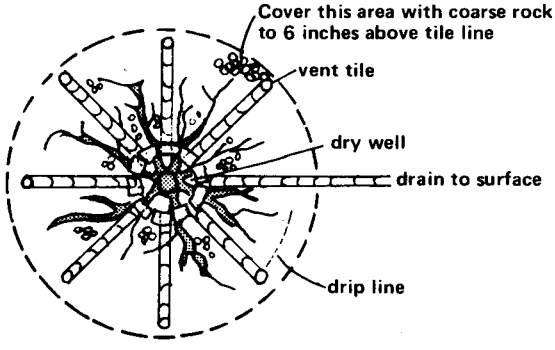

Figure 6. Lowering soil level.

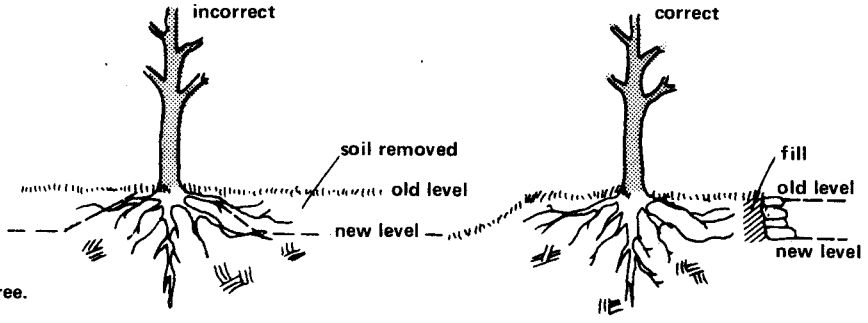

Figure 7. Protecting tree from cut-and-fill damage.