

# Recognizing Living, Hazardous Trees

Most people realize dead trees should be removed as soon as they are detected, however, living trees also can be a threat to life and property. A living hazard tree may have one or more defects which decrease its structural integrity and give it an increased potential for failure.

Unfortunately, this potentially deadly combination of defective trees with areas where people or their property stop and congregate are all too common in today's urban and residential landscape. Tree managers or home owners must have the ability to identify and then correct hazardous situations caused by defective trees.

Trees are complex and highly adaptable organisms. Knowing how trees are constructed, function, and respond to wounding can help home owners understand the eventual aging process and ultimately insure the safety of people who work and play near them.

## Tree Structure

Trees have massive stems that support and elevate the leaves. The stem is also the transport system for moving materials from the root to the leaves and back again. Tree stems must grow every year. Each spring and summer a new sheath of living wood covers last year's tree. If a tree cannot grow every year, it will decline and die.

A cross section of a tree trunk has many layers. The outside of the tree is dead bark which protects the tree. The inner bark or phloem tissue is alive and carries food manufactured in the leaves to lower, above ground portions of the tree, and to the roots. The layer between the bark and wood is called the cambium. The cambium produces wood cells to the inside and bark cells to the outside. Actively growing cambium results in an increase in stem diameter. In addition, the

cambium is a major reaction site that responds to injury.

Inside the cambium are annual rings of wood. The large pores in each annual ring (xylem) are dead, but are still capable of transporting water to the leaves. Nearly all of the volume of a tree is wood or xylem.

## Structural Support

If the internal woody tissues become unsound for any reason, such as internal decay, then most of the structural support for the tree will be compromised. The tree will remain alive, however, because the living cells near the cambium will continue to grow, laying down new phloem and xylem tissues. The result is a relatively healthy-looking tree with a functional outer sheath, but one that lacks sufficient structural strength from wood to support itself, particularly during extreme weather events.

A tree's structural support is most important during high winds or when snow and ice have accumulated on branches. For example, accumulation of ice can increase the branch weight of trees by 30 times or more. This additional weight may not pose a problem for relatively young trees, however, as trees grow old, they are less able to compartmentalize or seal-off injured portions of the tree and decay is more common.

In addition, older trees have a greater tendency to shed branches due to unavoidable decline in wood quality.

Besides age, growth rate and ability to respond to injury will influence a tree's functional life span. Fast growing trees like silver maple, poplar, and willow allocate a relatively small portion of internal resources to building compartments that keep pests and decay from spreading.

Instead, they rely upon a rapid rate of growth to outdistance decay-causing pathogens. But as

they age, their rate of growth slows, and significant decay and structural failure become likely.

On the other hand, trees like oak grow slowly and allocate a significant proportion of resources to defense. These trees compartmentalize wounds and in general are long-lived and less likely to fail.

## Possible Structural Problems

There are four ways that living trees become structurally unsound.

### Internal decay in the trunk and large branches

Decay in living trees is the end result of many complex interactions between the tree and several groups of fungi and bacteria. Many of these microorganisms are opportunistic and enter through wounds.

Healthy and vigorous trees have adequate defense systems that limit the spread of decay caused by these pathogens, however, older trees or those in poor health are at a disadvantage, and extensive columns of decay often result. Once decayed tissue takes over a large volume of the trunk, the tree will be unable to support its own weight and may fail at any time (even though failure is most likely to occur during periods of high wind).

Here are the warning signs of internal decay:

- Large, wide wounds or cavities
- Presence of fungal fruiting bodies or conks
- Bleeding (oozing sap) through the bark
- Presence of carpenter ants, termites, nesting holes and bee hives
- Loose, cracking bark
- Overall poor appearance, slow growth, or twig and branch die-back

### Cankers and canker-rot

— Cankers, localized dead areas

on the bark caused by bark-inhabiting microorganisms, also can lead to structural instability in a tree. Cankers on the trunk and branches are inherently weak spots and trunk and branch failure may occur at old cankers.

Canker-rot occurs when microorganisms attack and decompose the wood beneath the canker and adjacent bark tissues. Most canker-rot is likely to cause tree failure because of the combined effect of dead bark around the circumference of the tree (from the canker) and loss of internal support (from wood decay). Trees with canker-rot are very hazardous and should be removed as soon as possible.

**Cut roots and root decay** — Anything that alters or compromises the structural support provided by any part of the root system decreases the stability of the tree.

Two major culprits that jeopardize the integrity of roots are:

- Root-rotting pathogens that attack weakened trees or enter through wounds and cause root decay, and
- The severing or cutting of any portion of the root system. In addition, soil erosion, drought, gas leaks, changing the grade around trees, flooding, soil compaction, or paving around trees can kill roots. Building, road, and sidewalk construction, or utility installation are especially damaging to the roots of nearby trees. Large, heavy equipment used around trees often severs or injures a large portion of the roots. Without the support of the entire root system the tree is structurally weakened and the probability of failure increases as the amount of injured roots increases. Trees that have lost 50 percent or more of their root systems during construction should be removed.

**Poor branch attachment** — To have a strong attachment, a branch must be smaller (40 to 50 percent smaller) than the trunk or limb from which it arises. If the branch and trunk are close to the same size, their attachment may be weak and breakage may occur. Competing leaders and upright-growing branches with acute angles of attachment also are areas of potential weakness.

Some tree species such as horsechestnut, silver maple, linden, tulip tree, and willow are more likely to break because of their inherent poor branching habits. These species should be examined carefully when they are young so that structural flaws can be corrected.

## Reducing the Risk

Early detection of tree defects can prevent tree failures and potential damage to property and injury to people and pets. There are three ways to reduce the risk associated with hazardous trees.

**Remove the target** — While homes or power lines cannot be moved, sometimes picnic tables, cars, landscape features, play areas, etc. can be relocated to prevent them from being crushed by a falling tree.

**Remove the tree** — Some hazardous trees are best removed from the landscape. Remember, "When in doubt, take it out!"

**Prune the tree** — Removing defective branches might alleviate a hazardous situation.

Trees that are suspected of being hazardous should be examined by a Certified Arborist. If the tree is located near a power line, contact your local utility. (MJF)

# Using Wood Chips for Mulch Has Multiple Benefits

Wood chip mulch is made from the chipping of tree and landscape prunings. Rather than taking up landfill space, these once discarded products (including Christmas trees) are now providing a better growing environment for new plants in landscapes and gardens.

## Benefits of Mulch

Mulch is material placed on the soil surface for the purpose of protecting the soil and plant roots. Not only do organic mulches add a decorative natural appearance to the landscape, they also provide many landscape benefits.

### Helps retain soil moisture.

Mulch helps soil retain moisture and reduces water evaporation caused by wind and hot sun. Under its insulating blanket, soil remains moist long after bare areas become dry and require irrigation.

### Reduces soil temperature extremes.

An application of mulch helps avoid extreme

temperature fluctuations. It acts as an insulating blanket and keeps soil cooler during hot periods and warmer in winter months.

**Reduces weed growth.** When the site has been properly prepared, mulching reduces weed growth (the headache of many gardeners). Occasional persistent weeds will need to be removed.

**Saves time in landscape maintenance.** Place mulch under and between plants in tree and shrub beds, border plantings, hedges, rose beds and fruit orchards. By replacing grass with mulch, mowing and watering time is cut dramatically.

**Gives a natural look.** A few fallen leaves in a planting bed with a wood chip mulch gives your landscape the natural beauty of a forest floor. When you choose to remove the leaves, they too can be recycled by composting and then used as a soil amendment.

**Prevents direct contact with soil.** Mulch prevents vegetables (including squash, pumpkins, melons, cucumbers, and unstaked tomatoes) from making soil contact, thus helps to reduce rot caused by soil microorganisms.

**Creates paths.** A thick layer of mulch can be used to create walkways throughout the yard. Mulch paths permit easy access to any part of the landscape, even after heavy rains. No longer is a wet plot off limits until soil has dried sufficiently. During dry periods, mulch also reduces dust.

**Prevents heavy rain damage.** Mulching prevents soil erosion. It permits water to seep slowly beneath the protective covering.

**Increases survival of new trees.** Not only do mulches keep the soil cool and moist, they also keep the lawn mower and weed trimmer from

damaging young bark and killing trees.

## Site Preparation/ Application

For best results, remove existing weeds and turfgrass prior to applying the mulch directly on the soil.

Keep the mulch two to three inches from the base of plants. Due to decomposition, you may need to topdress with a thin layer of new mulch each year.

- Apply to a depth of three to four inches.
- Apply mulch in a three- to six-foot diameter under newly planted trees.
- Apply mulch in a one-foot band around large tree trunks to make mowing easier.
- Apply beyond the spread of shrubs to allow for growth without lawn mower interference.
- Cover the soil to the drip line under fruit trees for optimum growth.

## It's an Alternative

Wood chip mulch is an alternative to:

- river rock
- volcanic rock
- white marble rock
- cypress mulch
- bark chips
- straw

## Wood Chips Are Available from City

The City of Lincoln distributes wood chips to the public.

Free wood chips are available from Oak Lake Park, First and Cornhusker Highway on a first-come, first-served basis and must be self-loaded.

The 48th Street Transfer Station also has wood chips available for a fee of \$5 per cubic yard and will load pick-up trucks.