



Extension

UNIVERSITY OF WISCONSIN-MADISON

Why Trees Fail During Storms

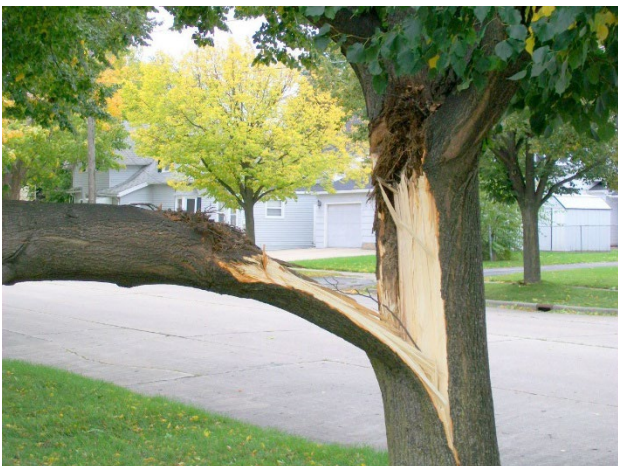
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Cleaning up damaged trees, broken branches, and scattered debris after severe weather can be both tedious and costly. Yet examining storm-damaged trees often reveals valuable clues about **WHY** they failed. Three of the most common factors behind tree failure during storms are **weak branch unions**, **decayed wood**, and **root problems**.

WEAK BRANCH UNIONS

When assessing a tree, look beyond the canopy's foliage and evaluate its overall structure—especially the way branches connect to the main or lateral stem. A mature tree leaning more than 40 degrees is a significant concern. Such a lean creates structural imbalance and greatly increases the likelihood of failure. Trees with this condition should be removed before the next major storm.

A tree's branching structure is largely determined by its natural growth habit. Trees with strong branch unions are better able to withstand high winds and heavy snow loads. A strong union is typically identified by a broad, U-shaped branch angle and an upturned branch bark ridge—the raised strip of bark between the branch and the main stem.



Weak branch unions form when branches and stems (or co-dominant stems) grow too closely together, creating a tight V-shaped angle. This condition, known as **included bark**, prevents proper wood formation and results in a structurally weak attachment. As the tree grows, the union becomes increasingly prone to splitting and failure. Nearly one-fourth of urban tree failures during windstorms are attributed to weak branch unions.

Corrective pruning during a tree's youth can prevent these defects. Species known for developing poor branching structure include linden, silver maple, boxelder, Freeman maple, red maple, Callery pear, hackberry, and willow.

DECAYED WOOD

Tree decay often begins with a wound—commonly caused in urban environments by lawn-mower impacts, vehicle damage, improper pruning, or vandalism. Once the bark is compromised, decay-causing fungi can enter the wood and gradually weaken the tree's internal structure.



Signs of decay include hollow cavities, soft or rotten wood, mushrooms or conks, bulges, and large cracks. If more than 40 percent of a tree's trunk or major branches show evidence of decay, the risk of failure is significantly elevated.

To find a qualified arborist in your area, visit:
<https://www.waa-isa.org/>

ROOT PROBLEMS

Heavy rain combined with strong winds can uproot mature trees—a phenomenon known as **windthrow**. But why does one tree topple while its neighbor remains standing?

Some species, such as willow, poplar, cottonwood, and Norway maple, naturally develop shallow root systems that make them more vulnerable to windthrow. When soil becomes saturated during prolonged rainfall, these shallow roots lose their grip, allowing wind to easily lift and topple the tree.

Other factors that increase windthrow risk include construction damage to major roots, trenching near the tree, or installing deep landscape edging that restricts root spread.



PROTECTING YOUR PROPERTY

Identifying these common structural defects—and addressing them early—can greatly improve tree safety and longevity. Routine tree health and risk assessments should be performed by a **certified arborist**.