Hazard Tree Assessment: How Arborists Determine Whether a Tree Is Actually Dangerous

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Every tree carries some degree of risk.

That statement often surprises homeowners and property managers because trees are frequently viewed in one of two ways. Either they're healthy and safe, or they're dead and dangerous. In reality, tree risk is far more nuanced than that.

A tree can have visible defects and present very little risk. Conversely, a healthy looking tree can have structural characteristics that significantly increase the likelihood of failure under the right conditions.

This is why professional arborists do not simply look at whether a tree has defects. We evaluate the probability that a tree, or part of a tree, will fail, what it could reasonably strike if it does fail, and what the consequences of that failure would be.

That process is known as a hazard tree assessment.

What Is a Hazard Tree Assessment?

A hazard tree assessment is a systematic evaluation of a tree to determine the level of risk it poses to people, property, or infrastructure.

Notice that the objective is not to determine whether a tree is "good" or "bad." The objective is to understand risk.

Professional arborists evaluate four primary components during a hazard assessment.

1. The likelihood that the tree, or part of the tree, will fail.
2. The likelihood that the failed tree or tree part will strike a target.
3. The consequences if that impact occurs.
4. The overall level of risk after considering all three factors.

This methodology forms the foundation of the International Society of Arboriculture's Tree Risk Assessment Qualification (TRAQ) program and has become the industry standard for evaluating tree risk.

Tree Risk Is About More Than the Tree

One of the most common misconceptions about hazard trees is that risk is determined solely by the condition of the tree. While structural defects are certainly important, they are only one component of a professional tree risk assessment.

Equally important is understanding what could be affected if the tree, or part of the tree, were to fail.

In arboriculture, these are referred to as targets. Targets include people, homes, vehicles, driveways, sidewalks, patios, utility lines, playgrounds, and other areas where damage or injury could occur if a tree or branch were to fail.

Consider two identical trees with the same structural defect. One is located in the middle of a wooded area where people rarely venture. The other is growing over a frequently used driveway.

Although the condition of the trees is identical, the level of risk is not.

The tree in the wooded area may warrant periodic monitoring, while the tree over the driveway may require mitigation because the likelihood of striking a target is significantly greater.

This illustrates an important principle of hazard tree assessment. Arborists do not evaluate trees in isolation. We evaluate the relationship between the condition of the tree, the likelihood of failure, the probability of impacting a target, and the consequences if that impact occurs.

For this reason, a tree with visible structural defects is not necessarily hazardous, and a tree with relatively minor defects may present an unacceptable level of risk if it is located where people or property are regularly exposed.

What Arborists Look For During a Hazard Tree Assessment

Every tree is unique, but experienced arborists evaluate a consistent set of structural characteristics.

Some of the more common defects include:

- Dead or dying branches
- Weak branch attachments
- Included bark
- Co-dominant stems
- Large cavities
- Evidence of decay
- Previous branch failures
- Excessive end weight
- Poor pruning history
- Leaning stems

- Root damage
- Soil movement around the root flare

Finding one or more of these defects does not automatically mean a tree should be removed.

The question is always whether those defects meaningfully increase the likelihood of failure.

Why Past Pruning Matters

Many of the hazardous trees we evaluate were not born with poor structure.

They developed it.

Poor pruning practices can permanently alter the architecture of a tree.

Over-thinning the interior canopy, commonly called lion-tailing, removes the smaller branches that help distribute mechanical loads throughout the canopy. Over time, this can produce long, slender limbs with heavy end weight and very little taper.

Similarly, topping a tree often creates multiple weakly attached shoots that eventually become large scaffold branches with poor attachments.

These structural issues may not become apparent for years or even decades.

By the time a homeowner or property manager notices something looks unusual, the underlying problem has often been developing for a very long time.

Trees Respond to Their Environment

Trees are not static structures. They are living organisms that continually adapt to the conditions around them.

Every year, a tree responds to gravity, prevailing winds, available sunlight, soil moisture, and competition from neighboring trees. As those conditions change, the tree changes with them. Sometimes those adaptations make a tree stronger. Other times, they create structural weaknesses that may not become apparent for years.

Wind exposure is one of the most important factors arborists consider during a hazard tree assessment.

A tree growing alone in an open field experiences wind very differently than a tree growing in the middle of a dense stand. Open-grown trees are subjected to greater mechanical loading throughout their lives and typically develop broader trunks, stronger branch attachments, and more tapered limbs. Trees that have spent decades protected by neighboring trees experience

much lower wind loads and often develop taller, more elongated growth habits with comparatively less structural adaptation.

This distinction becomes important when surrounding trees are removed. A tree that has been sheltered for decades may suddenly be exposed to wind forces it has never adapted to withstand. It is not uncommon for the remaining trees to become more susceptible to branch or whole-tree failure in the months or years following construction projects, selective tree removals, or forest thinning.

Changes below ground can be just as significant.

Trees depend on extensive root systems for both stability and water uptake. Construction activities that sever roots, trenching for utilities, excavation, soil compaction from heavy equipment, or changes to the natural grade can all reduce a tree's ability to anchor itself and remain healthy. In many cases, the effects are not immediate. A tree may appear unaffected following construction, only to begin declining several years later as root loss impacts its ability to support the canopy.

Even seemingly minor changes can influence tree stability. Raising or lowering soil grades around the root flare, installing retaining walls, changing drainage patterns, or replacing permeable landscape areas with pavement can alter the growing environment enough to affect long-term tree health and structural integrity.

Environmental conditions also play a role. Prolonged drought, saturated soils, repeated flooding, severe windstorms, heavy snow, ice loading, and prolonged heat can all increase the likelihood of failure, particularly in trees that already possess structural defects.

For these reasons, arborists evaluate much more than the tree itself. We consider the history of the site, recent construction activity, changes in the surrounding landscape, soil conditions, drainage, neighboring trees, and how the tree has adapted to its environment over time.

A hazard tree assessment is not simply an inspection of the tree. It is an evaluation of the relationship between the tree and everything around it.

Does Every Hazardous Tree Need to Be Removed?

No.

Removal is only one of several possible recommendations.

Depending on the findings, mitigation may include:

- Structural pruning
- Deadwood removal
- Crown reduction
- Cabling or bracing

- Periodic monitoring
- Advanced diagnostic testing
- Restricting access beneath the tree
- Complete removal

The goal is not to remove trees.

The goal is to reduce risk to an acceptable level while preserving healthy trees whenever practical.

Sometimes that means removal.

Many times, it does not.

When Should You Schedule a Hazard Tree Assessment?

You should consider having your trees evaluated if you observe any of the following:

- Large dead branches
- New or increasing lean
- Cracks in the trunk
- Mushrooms growing from the trunk or root flare
- Cavities
- Recent branch failures
- Construction near mature trees
- Root damage
- Soil lifting around the base of the tree
- Storm damage

You should also consider an assessment if a large tree is located near your home, driveway, outdoor living space, or another area that is occupied regularly.

The Bottom Line

No tree can be considered completely risk free.

Likewise, no single defect automatically makes a tree hazardous.

A professional hazard tree assessment considers the condition of the tree, the surrounding site, the targets beneath it, and the potential consequences if failure occurs. Only after considering all of those factors can meaningful recommendations be made.

The purpose of a hazard tree assessment is not to find reasons to remove trees. It is to understand risk well enough to make informed decisions that protect people, property, and the long-term health of the urban forest.

Frequently Asked Questions

Can an arborist predict exactly when a tree will fail?

Not exactly.

Trees are living organisms, and no arborist can predict the precise moment a tree or branch will fail. However, experienced arborists can often determine when a tree exhibits characteristics that make failure increasingly likely.

In some cases, a tree may display defects that indicate imminent failure, such as an actively splitting trunk, significant root plate movement, a hanging limb, or a tree that has partially uprooted. In these situations, immediate action is often warranted because the likelihood of failure is unacceptably high.

Most hazard tree assessments, however, focus on evaluating the probability of failure over a defined period based on the tree's condition, structural defects, site conditions, and expected environmental influences. While no assessment can eliminate uncertainty, it provides homeowners with the information needed to make informed risk management decisions.

Is a cavity always a reason to remove a tree?

No.

Many trees successfully compartmentalize decay and remain structurally sound for many years. The size, location, species, and amount of remaining sound wood all influence whether a cavity represents a meaningful increase in risk.

Can a healthy looking tree still be hazardous?

Yes.

Some of the most significant structural defects are not immediately obvious to homeowners. A tree may appear vigorous while still possessing characteristics that increase the likelihood of failure.

How Often Should Trees Be Inspected?

There is no universal inspection schedule that applies to every tree. The appropriate frequency depends on the tree's age, species, condition, location, and the potential consequences should a failure occur.

As a general rule, mature trees should be inspected periodically by an ISA Certified Arborist, particularly if they are located near homes, driveways, sidewalks, or other frequently occupied

areas. Trees with known structural defects, declining health, or a history of branch failures often benefit from more frequent evaluations.

It's also a good idea to schedule an inspection after significant windstorms, construction or excavation near the root system, grade changes, nearby tree removals, or any noticeable change in the tree's appearance or condition.

When in doubt, schedule an inspection. Most hazardous trees don't become hazardous overnight. Changes in structure, health, and site conditions often develop gradually, and identifying those changes early gives homeowners the greatest number of management options.