

TREE RISK ASSESSMENT

And Hazard Abatement

Living on the California central coast or in other forested areas often brings special concerns for potential tree related risks for life and property. Homes and businesses are situated along the coast and in the forested areas of the coastal mountain range where trees get big and storms can be intense.

Many areas in the Santa Cruz Mountains have a dense population of large native trees which can reach heights of over 150 feet, and have trunk diameters in excess of four feet. Coast redwoods and Douglas firs can grow to a height of 200 feet or more.

A serious concern for property owners living in a forest like this is the potential risk for life and property from falling trees and tree parts. The size of some trees and proximity to adjacent homes creates a potential for property damage and/or personal injury from:



- Limb or top breakage, often associated with heavy winds during storm conditions.
- An entire tree toppling due to up-rooting or decay and structural failure, high winds and wet soil.
- Heavy creek water flow and washing out of the soil around the root system.
- Water saturation of the soil and mud slides carrying the trees with it.

Much of tree risk assessment is common sense observation, spotting of something that doesn't look right. Property owners and managers should do regular

inspections of their trees and note irregularities and suspected problem situations.

Call an arborist for confirmation and management suggestions and, if needed, tree service contractor selection.

There is no way to 100% accurately predict or prevent limbs, tops or trees coming down, or where they will land when they do come down; even healthy trees can break or fall under extreme storm conditions.

Tree risk assessment is not an exact science, the determination of hazard potential is based on the professional opinion and judgment of the arborist from

LARGE GROWING TREES OF THE SANTA CRUZ MOUNTAINS

- Coast redwood (*Sequoia sempervirens*)
- Coast live oak (*Quercus agrifolia*)
- Tanbark oak (*Lithocarpus densiflora*),
- Douglas fir (*Pseudotsuga menziesii*)
- California bay laurel (*Umbellularia californica*)
- Big leaf maple (*Acer macrophyllum*).

Some coastal zone areas have stands of:

- Monterey pine (*Pinus radiata*)
- Monterey cypress (*Cupressus macrocarpa*)
- Ponderosa pine (*Pinus ponderosa*)

- And the non-native
• Blue gum (*Eucalyptus globulus*).

“Tree risk assessment is the systematic process of assessing the potential for a tree or one of its parts to fail and, in so doing, injure people or damage property. All trees have the potential to fail. The degree of risk will vary with the size of the tree, type and location of the defect, tree species, and the nature of the target. Tree risk assessment involves three components:

- 1. A tree with the potential to fail,*
- 2. An environment that may contribute to that failure, and*
- 3. A person or object that would be injured or damaged (i.e. the target)”*

Nelda Methany and James R. Clark

years of experience, knowledge of tree species, structural and environmental factors.

A certain degree of risk must be accepted wherever there are trees and targets; final decision of acceptable or unacceptable risk is up to the property owner.

RISK INSPECTIONS

Initial technical inspections are based on visual tree and site assessment, sounding (tapping on trunk and scaffold limbs to detect sound variations), probing for decay pockets and root placement, and evaluation of potential targets in relation to the tree in question.

Initial inspections can be used to determine obvious hazards and potential problems, or to identify need for further examination.

To assist in evaluation and rating of risk according to professional standards, ISA certified arborists use the checklist and rating system of the **Tree Hazard Evaluation Form** from the publication

“A Photographic Guide to the Evaluation of Hazard Trees in Urban Areas” by Methany and Clark.

More thorough technical examination can include:

- Excavating around the base of a tree to expose the root collar and major structural roots where decay is often present but unobservable without exposure.
- Climbing of the tree to examine potential structural defects of limbs, stem and top.
- Examination with modern instruments for decay detection and stress assessment: resistance drill, acoustic tomography, radar, and wind load analysis.
- Determining property lines and responsibility for liabilities.
- Measuring heights and distances and calculating possible worst-case scenarios.

RATING AND MANAGEMENT OF HAZARDS

When *Tree Solutions* arborists inspect and evaluate trees for risk, we put the hazard potential into certain categories of urgency. Following the determination of risk, recommendations for management of that risk are presented:

The most immediate hazards to identify are trees in the process of uprooting, splitting apart, or with breakage of limbs or stem, representing imminent structural failure.

1. **Imminent Hazard-** Tree structural failure in progress with a target within range:
 - Uprooting with noticeable soil fissures, heaving of the root plate, structural root fractures.
 - Tree trunk or large limb breakage, often associated with overburdened weight distribution or leaning.
 - Advanced decay weakening the structural integrity of the tree.
 - Tree parts broken and hanging.

Any of the above factors combined with near proximity to a home or business structure, power lines, road or driveway would indicate a dire emergency. Get a tree crew out now for emergency removal, on overtime if necessary.

2. **Urgent Hazard-** Compromised structural integrity, but not as immediate as above, no observed failure in progress:
 - A tree leaning toward a house, overburdened limbs or top over a house, patio or driveway.
 - Big trees in a potential mudslide area above a house.
 - Construction activity or other damage of the trunk, large limbs or structural support roots.

Schedule removal or safety pruning as soon as possible, before the next storm.

3. **Potential Hazard-** Condition unclear from initial inspection. Root collar exam or other further inspection needed to determine degree of risk:
 - Tree leaning toward house could become dangerous if allowed to continue growth in that direction.
 - Shallow topsoil on rock base creating shallow rooting and vulnerability to toppling.
 - Structural defects- co-dominant stems, or suspected decay conditions that could weaken tree structure if allowed to advance.
 - Dead or declining foliar top or other tree health issues that should be addressed or tree may weaken or die and become dangerous.

Schedule further inspection, pest/disease control or tree pruning sometime in the near future.

4. **Preventive Maintenance-** Known risk factors are identified that could become an issue if allowed to develop:
 - Schedule crown cleaning and thinning and/or crown reduction pruning.
 - Remove selected overcrowded trees to allow light and space for remaining trees to grow with balanced weight distribution.
 - Initiate pest and disease management program.

TREE RISK ABATEMENT

If a particular tree or group of trees is determined to have hazard potential, specific means of abatement can be recommended.

Pruning can be specified to reduce overall tree height, density or canopy spread. Designated limbs can be relieved of excess weight or length. The direction of growth can be re-directed by selective pruning. Defective structural components can sometimes be removed.

Installation of cables and other forms of bracing, through-bolts and props, can be used to reinforce a structural weakness.

Target removal or re-location if possible should be considered as an alternative to tree removal.

Tree removal is a last resort when all other forms of abatement have been ruled out.

Topping (heavy crown reduction or stubbing) is usually not recommended, but can be a short term, cost effective alternative to removal when immediate safety and not tree care is the priority.

Topping can be ugly and create future problems and risk due to possible rapid re-growth and the nature of the weak structural attachments that form as a result. **If a tree is topped, it necessitates follow-up with an annual inspection and maintenance program or a plan for progressive removal of the tree.**

Moderate crown reduction by selective pruning is preferred when height reduction is indicated.



Pest and Disease Factors: Wood rot fungus infection is the primary disease issue in relation to tree structural failure. It exists in varying stages in many trees and is to be expected in a forest environment. Advanced stages of decay in roots, stems or branches can contribute to structural failure. Pest infestations can create or hasten decline in health and structural defects.

Many of the trees in this geographical area are re-sprouts from old cut stumps due to logging and land clearing. This presents a potential problem in that advanced decay of the parent stump and roots (which may be below ground and not visible in a superficial inspection) could create a compromise to the structural integrity of the standing tree.



Some structural defects (clockwise from top left): 1. Imbalanced weight distribution, leaning. 2. Co-dominant stems splitting apart. 3. Large deadwood. 4. Large wound at critical location.

Forest fires are another major concern with need for preventive maintenance. Regarding fire prevention, fire departments recommend clearing all trees and brush within a 30 - 100 foot distance of the structures to create a “**defensible space**”. Obviously the more distance the better, and some trees and shrubs are more flammable and therefore more important to clear than others. Even beyond this defensible range, clearing of deadwood and lower limbs can prevent fire transferring from grasses and shrubbery to the tree canopies and roofs of structures.

If you have trees near your home it is better to be safe than sorry. Have a *Tree Solutions* arborist inspect the trees, discuss findings with you and make recommendations, or write a report with detailed observations and specifications for management of risk.

The cost of prevention is usually much less than the cost of loss and inconvenience of damage.

