CHAPTER 12
TREE ASSESSMENT AND RISK MANAGEMENT
INTRODUCTION

- **Hazard potential** is the degree of risk posed by a tree.
- Trees are hazardous when failure of their parts results in property damage or personal injury.
- **Structural defects** are flaws, decay, or other faults in the trunk, branches, or root collar or a tree, which may lead to failure.
RISK ASSESSMENT

- Potential of the tree to fail - large limbs or small branches, branch attachments, defects, and history
- The environment that may contribute to failure - storms, winds, lightning, construction, slopes, and soil conditions
- Potential target - structures, vehicles, and people
Risk Management is evaluating trees for their potential to fail.

Almost all trees pose a risk of failure.

The more mature the tree is, the greater the risk.

Decisions must be based on a thorough assessment using the best information available.
IDENTIFYING POTENTIAL HAZARDS

- With proper training, an arborist can learn to identify characteristics that often result in failure.

- Defects are not always visible.

- Again, with experience, one can learn to recognize patterns of failure that will help in recognizing risk factors.
GENERAL INSPECTION

- Tree inspection must be a systematic process.
- Diagnosing tree hazards requires fundamental knowledge of tree structure and physiology
- **Step 1** assess the tree as a whole
- **Step 2** inspect the trunk, root crown and the root zone
- **Step 3** examine the canopy of the tree
STRUCTURE

- Examine the branch angles and branch attachment of the major scaffold branches
  - Branches should be smaller in diameter than their parent branches
  - Check for proper branch bark ridge formation
STRUCTURE

- Look for co-dominant stems
  - High risk for failure
  - They often have included bark
STRUCTURE

- Stems with **good taper** tend to be stronger than those without.

- Good **taper** are stems that are significantly larger at the base and smaller toward the end
  - Trees grown in the shade tend to have little taper
  - When protection of the surrounding trees is removed, they are more likely to fail
STRUCTURE

- **Reaction wood** is wood formed in leaning or cooked stems, or on lower or upper sides of branches.
- Many trees have a natural lean.
STRUCTURE

- Look for signs of vigorous growth

Growth rate and good compartmentalization are important in the reduction of hazards
POTENTIAL PROBLEMS

- Dead branches within the canopy are the most obvious potential hazards
- Watch for longitudinal cracks or splits on the trunk or major branches
  - Cracks that start at a branch union may be especially hazardous
  - Cracks on decayed stems or branches may indicate imminent failure
POTENTIAL PROBLEMS
POTENTIAL PROBLEMS

- An observant arborist may be able to detect internal defects where the stem is out of round.

- Asymmetric shapes may be caused by the tree’s formation of reaction wood and may be an indication of an internal problem.
FAULTS AND DEFECTS

Co-dominant stems can often be failure points. Multiple branch attachments at one point on a stem can also be a defect.
FAULTS AND DEFECTS

- Branches or stems that lack taper, especially if weight is concentrated near the end, are prone to failure.
FAULTS AND DEFECTS

- Cankers
- Gall
- Wounds
TREE CANKER
TREE GALL
Cracks or separations in the soil may indicate soil heaving from excessive movement of the roots, which can be a warning sign for failure, especially if the tree is leaning.
FAULT AND DEFECTS

- Humanmade
DECAY AND DISCOLORATION

- Decay is perhaps the most insidious defect within a tree.
- Decay can cause significant loss in strength.
- If the tree has 30 to 35 percent loss to decay action should be taken to remove the branch or tree.
- If there is a large cavity it drops down to 20 to 25 percent decay.
SIGNS OF INTERNAL DECAY

- Look for open wounds or cavities
- Cracked or loosened bark should be examined for sign of decay underneath
- The presence of carpenter ants or other wood boring insects
- The presence of **fruiting bodies** or **conks**
- Birds nesting in hollows or feeding on insects
- Honeybees often make hives in tree cavities
IF DECAY IS FOUND

- Investigation may be needed
- Increment borers can help to determine how much decay is present
- Root collar excavations may be necessary if decay is suspected in the root flare
- Aerial inspection
RISK ASSESSMENT AND MANAGEMENT

- Competent assessment of tree risk requires not only a strong foundation in tree biology but also a fundamental comprehension of the structure-function relations of trees.
- A strategy should be developed for the assessment process.
- All observation, measurements, and recommendations must be documented.
RISK ASSESSMENT

- Hazard assessment forms help with consistency
- Environment
- Targets should be identified
- History
- *A Photographic Guide to the Evaluation of Hazard Trees in Urban Areas*
- Risk tolerance
MITIGATION OPTIONS

- Mitigation is the process of reducing damages or risk
- Dead or broken branches can be removed
- Reduce the weight of the limbs
- Removing a co-dominant stem that has split
- Remove the target
- Install cables or braces
- Continued monitoring
- Good management practices
LIABILITY AND NEGLIGENCE

 When a person has suffered injury or damages, liability must be identified and placed.

 **Negligence** is the failure to exercise due care

 **Negligence** occurs when somebody fails to perform a duty or obligation recognized by the law for the protection of others against unreasonable risks.
LIABILITY AND NEGLIGENCE

- **Liability** is something for which one is responsible; legal responsibility

- Liability is based on cause

- Causation in fact means that the injury can be traced back to the defendant’s action (or lack of it).
An act of God is an occurrence due to natural causes that could not have been prevented by ordinary skill and foresight.

Arborists must understand the responsibility and liability that accompany tree risk assessment. Because arborists are considered experts in the care of trees, they can be held to a higher standard for inspecting and recognizing hazards, even if they were hired for other purposes than tree risk assessment.
Questions?