CONTINUING EDUCATION UNIT

Managing Risk in the Urban Forest

Risk is all around us, in everything we do and in everything we experience.
—J. Richard Eiser, 2004

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LEARNING OBJECTIVES

The arborist will be able to

- understand how tree risk is derived from the broader concept of risk.
- identify the basic components of a tree risk management policy.
- appreciate the role of arborists in managing tree risk.

General Principles of Risk Management

Arborists tend to think of risk in terms of the possible harmful effects trees can have on people and property (that is, the danger that may be present). The definition of risk, however, is much broader. Professional risk managers define risk as deviation from the expected result. As described by Reiss (2004), "The presence of risk is not intrinsically harmful: Risk is simply a measurement of potential for deviation from an expected outcome, and the consequences of this deviation may be either good (resulting in opportunity) or bad (resulting in loss). The process of dealing with this uncertainty, and trying to achieve the best outcome, . . . in a changing environment, is the essence of risk management."

The Ultimate Goal of Risk Management . . .
. . . is to protect the health, safety, and well being of municipal staff and the public. Means to meet that goal must be designed within the limits of the financial resources of the agency.

Risk management is the process by which an individual or agency assesses and monitors its risks and selects and implements measures to address those risks. Risk has two components: uncertainty and value—the desirability and undesirability of different outcomes. People vary in the ways in which they deal with uncertainty concerning the things they value. People also vary in their perception of and tolerance to risk.

Risk management, however, does not come without costs. The need to avoid waste and unexpected expenses holds true for individuals, businesses, and other entities responsible for trees.

According to the National Center for Small Communities, risk imposes two types of costs on local governments: the cost of losses that occur and the cost of uncertainty. "Uncertainty affects a local government in that uncertainty leads to fear and worry among employees and citizens, and it also can lead to misallocations of limited resources. Both costs of risk are of concern to local governments since they put a strain on budgets. Therefore, a primary goal of risk management is the maintenance of budget stability through control of the costs of risk" (Young 2002). Risk management involves

- identifying, assessing, and prioritizing risks
- selecting and implementing risk control measures
- establishing methods for financing the cost of risk
- enabling an organization to coordinate its risk management efforts

Defining Acceptable Risk

We encounter risk management throughout our daily lives—from the safety of our roads to the quality of the foods we eat to the recreation we enjoy. Across society, the willingness to accept risk varies widely. What is well within the tolerance of one person may be unacceptable to others. The variable nature of risk acceptance among public agencies, elected officials, and citizens often creates uncomfortable

Municipal Arborists and Risk Management
Municipal arborists work in an environment in which people's varying tolerances to risk affect tree management decisions. The governing body must define acceptable risk and the amount of funding necessary to assess, monitor, and mitigate risks.

situations in which municipal arborists must act. Commercial and utility arborists must also navigate between differing tolerances, sometimes within the same household.

Risk Assessment

Risk assessment is the process of evaluating what unexpected things could happen, how likely they are, and what the likely outcomes are. Each risk must be assessed for its frequency of occurrence and possible negative consequences. Insurance, for instance, is generally available for risks with infrequent occurrence but severe outcomes (for example, health insurance and life insurance). According to Young (2002), the categories of risk that are commonly used in assessments are

- **Category 1:** Low frequency/low severity
- **Category 2:** low frequency/high severity
- **Category 3:** high frequency/low severity
- **Category 4:** high frequency/high severity

Risk managers typically focus on the "high frequency/low severity" and "low frequency/high severity" types of risks. Category 4 risks (high frequency/high severity) arise infrequently in risk assessments because they are identified and dealt with before the assessment takes place. Category 1 risks are of minor importance and only rarely produce losses.

Risk Control

There are five ways in which risks can be controlled:

- **Risk avoidance.** Avoid the activity to eliminate the possibility of loss. An example is eliminating building or public access within the fall zone of a tree with structural defects.

In some cases, risk of tree damage to buildings can be transferred from the tree manager to the property owner.

- **Loss prevention.** Reduce the likelihood of losses. Examples are proper training of employees, regular maintenance of equipment, pruning to develop strong branch structure in young trees, removing dead branches in trees, and repairing displaced sidewalk.
- **Loss reduction.** Minimize the impact of losses. Examples are training climbers to perform aerial rescues and developing storm response systems.
- **Uncertainty reduction.** Learn more about the risk in order to increase the ability to predict what will happen. An example is investigating the possible environmental and health effects of pesticides in use.
- **Risk transfer.** Contract with private or nonprofit organizations. The degree of risk transferred depends on the ability of the contractor to bear responsibility. Examples are contracting with a consultant to perform tree risk assessments or with a nonprofit organization to implement a planting program.

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Loss prevention includes proper training of employees and maintenance of equipment.

Another method of risk transfer is adopting statutes in the municipal code that ascribe certain responsibilities to property owners, creating a mandatory duty. Some examples are requirements for owners of private property to remove obstructions from and repair damage to the sidewalks adjacent to their property and requiring owners to maintain trees that are in the city's right-of-way. Commercial arborists can transfer risk associated with tree defects to property owners through a carefully worded, signed contract.

Duty and Standard of Care

Integral to managing risk associated with trees is managing liability should a tree fail. The question of liability is of critical importance because society tends to equate management responsibility with negligence. There is a clear feeling that "when I am in a city, it should be safe to sit under a tree. And, if a tree fails, then it is someone's fault." Trees are often shared assets—and potential liabilities—spreading over multiple properties and easements. Therefore, it is important for all arborists to understand the interests of adjacent property managers.

There are four conditions that define the presence of negligence and degree of any associated liability:

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People often think, "When I am in a city, it should be safe to sit under a tree." It is important for arborists to understand the interests of all affected parties."

- **Duty**—the obligation or responsibility to care for trees
- **Breach of duty**—the failure to act in a reasonable manner
- **Harm**—physical damage or property injury
- **Causality**—the breach of duty caused the damage or injury

Municipal arborists are actively involved in the first two of these four conditions. Almost by definition, they have a responsibility to care for trees. In addition, they have the duty to perform that management in a responsible manner. Thus, a municipal arborist who is responsible for a site with a hazardous condition has a duty to respond to the situation, like any manager of urban property does.

Breach of duty is the failure to act reasonably under the circumstances. The yardstick against which acts are judged as reasonable is the standard of care. Standard of care is defined as "that degree of care which a reasonably prudent person should exercise in [the] same or similar circumstances. If a person's conduct falls below such a standard, he may be liable in damages for injuries or damages resulting from his conduct" (Black 1990). As Dunster and Murray (1997) note, "The standard of care determines how the duty of care is measured."

In legal matters, the testimony of expert witnesses is often used to establish the standard of care. Also considered is the customary practice in the field. For example, it is customary for a climbing crew to perform a pre-climbing inspection of a tree. Failure to perform this routine task might be considered unreasonable. Similarly, failure to perform a routine safety check on a chain saw might be considered as failing to follow customary practice.

Failing to follow customary practice or a standard of care does not directly convey liability. For liability to be established, it must be shown that a tree owner, manager, or inspector either would have or should have known about a dangerous condition had the standard of care been followed. While it is possible that a dangerous condition would remain undetected even if customary practice was followed, issues of liability revolve around the standard of care.

A key aspect of duty is to act reasonably, to adhere to the standard of care for our work activities. A universal standard of care has yet to be defined for tree risk assessment. For the most part, the standard of care has been defined in individual court cases through the testimony of expert witnesses and the persuasiveness of attorneys. This leaves a large gray area of uncertainty, which companies and agencies can lessen significantly with a clearly articulated policy.

Municipal arborists can be proactive by defining the standard of care by which staff operates. The standard of care declaration would be one component of the risk management document.

Communicating Risk

Municipal and consulting arborists sometimes are placed in the uncomfortable position of having their observations and recommendations rejected. Anyone who has ever attended a public meeting on the topic of removal of an old, historically important tree knows that while communicating the results of the inspection and evaluation may be straightforward, reaching a decision about action almost never is. Although a tree may be in danger of failing, diverse opinions may exist about abatement. Deciding whether to remove or retain an old tree involves making a decision about risk and about the willingness to accept the risk of damage or injury should the tree fail.

Over the past two decades, there has been an increase in decision making driven by public opinion and nonexperts (Powell 1996). Powell described the growth of interest in risk communication as driven by four motivations:

When communicating risk, the arborist should describe costs and benefits, and relevant management issues. The goal is to facilitate the coexistence of people and trees.

- a requirement for—or desire by—government to inform in participatory democracies
- desires to overcome opposition to decisions
- a desire to share power between government and public groups
- a desire to develop effective alternatives to direct regulatory control

Experts generally use facts to focus on the hazards associated with risks and may pay too little or too much attention to the fears and concerns of the public. The arborist must be aware of these potential disparities and be prepared to communicate risk in a comprehensive fashion that considers all aspects of the trees and people involved. As in all arboriculture, the basic task is to facilitate the coexistence of people and trees. There are seven risk communication "rules" to use as guidelines (Covello and Allen 1988):

- accept and involve the public as a legitimate partner
- plan carefully and evaluate performance
- listen to your audience
- be honest, frank, and open
- coordinate and collaborate with other credible sources
- meet the needs of the media
- speak clearly and with compassion

When communicating risk, the arborist should provide as complete a picture as possible about the nature of the risks, what is certain and uncertain, costs and benefits, and relevant management issues. However, even when presented with a balanced, informative report, people of different values and interests may not come to consensus. Risk communication can be considered successful when the audience has a better understanding of the issues and they feel adequately informed.

Risk Management in Arboriculture

> *By following sound urban forestry management principles, including documented inspections and other planning and management actions that promote the overall health of the urban forest, arborists and urban foresters can assure the continued enjoyment of the many benefits conferred by trees, without exposing the community to unwarranted risks* (Anderson and Eaton 1986).

Trees fail. Roots push up sidewalks, creating a tripping hazard. Fruit drops on walkways, making the surface slippery. Tree branches grow into overhead lines, creating an electrical hazard.

Arborists around the world are concerned about managing trees to create healthy, attractive communities and properties while protecting the safety of the people using those spaces.

The municipal arborist, like the company owner or supervisor, is likely to be responsible for risk management in two arenas: risks that could affect the health and well-being of staff and those that could directly or indirectly affect the clients or the public. In most cases, the risks to assess and plan for include the following:

- **Risks primarily involving staff**
  - workplace safety
  - motor vehicle safety
  - pesticide handling
  - employment rights and practices
- **Risks primarily involving the clients or the public**
  - tree failure
  - conflict between trees and infrastructure, including sidewalks, underground services, overhead utilities
  - line-of-sight along streets
  - vertical clearance over streets and sidewalks
  - fruit and seed litter
  - emergency planning

Where the municipal arborist's responsibilities include parks, recreation, and facilities maintenance, the list grows longer. Commercial and utility arborists also must be aware of additional responsibilities that are defined or implied in their contract, whether verbal or written.

Developing a Risk Management Plan

Larger cities likely have a risk management specialist on staff or on contract who facilitates development of a risk management policy and program. The municipal arborist's efforts would be guided by that program. In smaller communities, the municipal arborist may be more active in driving the risk management program as it relates to the urban forest.

Drafting such a program could be the task of the staff arborists, or it might be contracted out to consultants experienced in risk management. In a private company or a utility company, the owner or supervisor either takes on or delegates this responsibility.

Most often, risk management plans prepared by arborists focus on tree risk assessment. A comprehensive risk management plan, however, should consider risks associated with all the activities under the arborist's control (as previously described in the section on risk management in arboriculture).

Following are the key components of a risk management plan:

- policy statement
- goals of the program
- standard of care statement
- determination of acceptable risk
- training and qualifications of risk assessors
- rating system for assessing relative risk
- risk assessment procedures
- frequency of assessments
- management options to mitigate risks
- record-keeping protocols
- how the program is funded
- program assessment and reporting

Risk Management Policy

The first step in developing any risk management plan is to prepare a policy statement that frames the scope of the plan, assigns responsibility for managing the plan, and describes what is to be accomplished. The arborist may

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draft a risk management policy, but it must be ratified by the body that is ultimately responsible for risk management in the company or community—the elected officials and top managers. That process should include review by legal representatives.

According to the National Center for Small Communities (Young 2002), a policy statement should include

- a statement of commitment that says top officials believe the practice of risk management is important and identifies the overall purpose of risk management
- a statement identifying who is responsible for risk management and what the person's authority is
- a charge to identify and assess risks
- a charge to select and implement risk control and financing measures
- a charge to audit and report on risk management efforts

Duntemann has incorporated those guidelines into the following example of a tree risk management policy:

The City of Metropolis has an active policy to maintain the safety of public lands from potentially hazardous trees. The City will strive to eliminate, in a timely fashion, any tree deemed hazardous. When available fiscal and human resources limit the ability of the City to remove high-risk trees, priority shall be placed on trees deemed to carry the highest risk. The standard for rating the hazard of a tree will be the International Society of Arboriculture's twelve-point rating system. The Superintendent of Forestry will administer this program and have final judgment in all matters concerning the mitigation measures taken for any tree deemed hazardous.

Standard of Care Statement

As already discussed, the arborist's duty is defined by the standard of care. Including a standard of care statement in the risk management plan makes it clear what is expected in the performance of the job. Along with these criteria, the statement could include methods and equipment used, such as when strength loss calculations and aerial inspections are warranted. Without this statement, defining the standard of care is out of the hands of the people who know and understand the job the best. It then falls into the hands of the courts, where there is greater uncertainty and expense.

Training Risk Assessors

Risk management can occur only when the nature of the risk is understood. Arborists with responsibility for tree inspections must be knowledgeable about tree biology, patterns of failure, site condition analysis, and related topics. This knowledge comes only with experience and specialized training.

Training programs can be developed in-house if a qualified trainer is on staff, through seminars conducted by professional organizations, and/or contracted out to private firms. Training attendance records should be maintained for all risk assessors.

Perhaps the most important aspect of training is to develop consistent evaluation procedures, among individuals and

Why Implement a Tree Risk Assessment Program?

There are three compelling reasons to implement a tree risk assessment program.

- By preventing and/or eliminating dangerous situations, public safety is enhanced.
- Tree risk assessment is a tool for scheduling, prioritizing, and budgeting work, allowing a greater degree of management efficiency and flexibility.
- By identifying and correcting structural defects that prevent failure, tree longevity is enhanced.

Standard of Care Statement

The following is an example of a standard of care statement for a tree risk management program as recommended by Duntemann.

The City of Treeland will meet or exceed all arboricultural industry standards in its tree risk management program through the following actions:

- Have a written policy regarding tree hazard management.
- Provide specialized training for all tree inspectors on identifying and evaluating structural defects in trees, developing risk ratings, and inspecting and evaluating tree–infrastructure conflicts. In addition, all inspectors will maintain Certified Arborist, Certified Tree Worker, Certified Municipal Arborist, Certified Utility Arborist, and/or Board-Certified Master Arborist status through the International Society of Arboriculture.
- Undertake systematic inspections of city trees on a schedule as described in the Tree Risk Management Plan. Inspections are to be visual, from a ground survey, walking 360 degrees around the tree.
- Document the inspections and communicate them to the appropriate person as defined in the Tree Risk Management Plan.
- Undertake/recommend appropriate risk management action according to guidelines in the Tree Risk Management Plan.
- Adhere to industry standards for general tree care activities, including the American National Standard Institute's standards for safety in arboricultural operations (Z133.1) and pruning (A300) and the International Society of Arboriculture's *Best Management Practices: Tree Pruning.*
- Perform a pre-climbing inspection prior to entry into the tree.
- Ensure that each climber will either report or abate any defects encountered while working in a tree that were not observed from a ground survey.
- Include goals and objectives for reducing tree failures in overall management programs, based on the high-risk features of a population.

Consistent evaluation procedures can be developed among individuals through on-the-job training with an experienced assessor.

over time. Components of a risk assessor training program may include

- goals of the risk management program
- responsibilities of the risk assessor
- tree biology, structure, patterns of failure
- site conditions such as soils, prevailing wind, climate, and recent history
- key tree and site characterizes that may lead to failure
- risk assessment procedures and rating system
- procedures for reporting and abating imminent hazards
- equipment and supplies used for assessing and recording risk
- method of recording observations
- abatement options to reduce risk
- safe work procedures
- on-the-job work with an experienced assessor.

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Photos courtesy of the authors.

CEU TEST QUESTIONS

To receive continuing education unit (CEU) credit (1.0 CEU) for home study of this article, after you have read it, darken the appropriate circles on the answer form of the insert card in this issue of *Arborist News*. (A photocopy of the answer form is ***not*** acceptable.) A passing score for this test is 16 correct answers.

Next, complete the registration information, ***including your certification number***, on the answer form and send it to ISA, P.O. Box 3129, Champaign, IL 61826-3129. Answer forms for this test, **Managing Risk in the Urban Forest**, may be sent for the next 12 months.

You will be notified only if you do not pass. If you do not pass, ISA gives you the option of re-taking the quiz until you do achieve a passing score.

1. By definition, risk is
   a. intrinsically harmful
   b. a deviation from the expected result
   c. always governed by policy
   d. all of the above
2. According to this article, the two components of risk are
   a. assessment and mitigation
   b. probability and outcome
   c. uncertainty and value
   d. assessment and value
3. Risk management involves
   a. identifying, assessing, and prioritizing risks
   b. selecting and implementing risk control measures
   c. financing and coordinating risk management efforts
   d. all of the above
4. Risk assessment involves all these **except**
   a. evaluating what unexpected thing could happen
   b. how likely it is
   c. who will be liable
   d. what the likely outcomes are
5. The willingness to accept risk varies widely because
   a. what is within the tolerance of one person may be unacceptable to others
   b. public agencies' risk acceptance is variable
   c. tolerances vary among citizens
   d. all of the above
6. Risk managers typically focus on the high frequency/low severity and low frequency/high severity types of risks
   a. true
   b. false

7. Risk can be controlled by
   a. risk avoidance
   b. risk transfer
   c. loss reduction
   d. all of the above
8. By learning more about the risk, it is possible to increase the ability to predict what will happen, which can
   a. transfer risk
   b. reduce uncertainty
   c. prevent risk
   d. all of the above
9. The establishment of negligence (and liability) is based on
   a. the obligation of a duty of care and breach of that duty
   b. harm: physical damage or property injury
   c. causality: the breach of duty caused the damage or injury
   d. all of the above
10. Duty of care is measured by
    a. standard of care
    b. attorneys
    c. expert witnesses
    d. Standard & Poor's
11. For liability to be established, it must be shown that a tree owner, manager, or inspector
    a. knew about a dangerous condition
    b. ignored a dangerous condition
    c. created a dangerous condition
    d. would have or should have known about a dangerous condition
12. Risks primarily involving staff include
    a. workplace safety
    b. motor vehicle safety
    c. pesticide handling
    d. all of the above
13. Risk tolerance is
    a. the same for all reasonable and prudent people
    b. standard among municipalities
    c. different for each individual
    d. standard among arborists
14. In communicating about risk to the public, the arborist should
    a. coordinate and collaborate with other credible sources
    b. listen to the audience
    c. be honest, frank, and open
    d. all of the above
15. A risk management plan
    a. prepares a policy statement that frames the scope of the plan
    b. assigns responsibility for managing the plan
    c. describes what is to be accomplished
    d. all of the above
16. Risk assessment procedures, record-keeping protocols, and a standard of care statement are essential components of a
    a. risk management plan
    b. risk policy statement
    c. risk rating system
    d. all of the above
17. Perhaps the most important aspect of risk assessment training is to
    a. develop consistent evaluation procedures
    b. earn a college degree
    c. hire a fungal pathogen specialist
    d. carefully measure all trees in question
18. A risk policy statement should
    a. frame the scope of the plan
    b. assign responsibility for managing the plan
    c. describe what is to be accomplished
    d. all of the above
19. Although an arborist may prepare a draft of a risk policy statement, such a policy is ultimately the responsibility of
    a. the body that is responsible for risk management
    b. the municipality in which the trees are located
    c. the company that is contracted
    d. each individual property owner affected
20. An important aspect of risk assessment training is a clear understanding of the
    a. risk assessment procedures and rating system
    b. procedures for reporting and abating imminent hazards
    c. responsibilities of the risk assessor
    d. all of the above