

Minimizing Tree Risks in Public Spaces

Gary Johnson

Professor, Urban and Community Forestry
University of Minnesota Extension, Department of Forest Resources

In the two previous parts of this three-part series on managing tree risks in public spaces, the principles of tree defect detection, identifying and ranking hazardous situations that involve tree defects, and developing a logical and professional approach to monitoring trees in public spaces were promoted as critical elements of a risk management program. Now, the final part: minimizing the risks to an acceptable level. Minimizing risks is a combination of instituting some maintenance

practices and avoiding others that can create harmful situations.



Large tree size only produces unacceptable risks in small spaces.

One: Zero Risk Management is not Possible.

I know what you're thinking. "Sure it is...cut down all of the trees!" That's as logical as removing all streets and paths to control traffic risks, all electrical services to eliminate risk of electrocution, and draining all lakes and ponds to create a landscape with no risk of drowning. Every single service, every part of open space infrastructure presents some level of risk. The smart



Whether the area around the tree trunk is mulched or kept clean with an herbicide, it removes the necessity of mowing or line trimming near the tree and therefore the chance of unintentional wounding.

and effective manager is the one who minimizes the critical risks to a level that is acceptable to the users of the park, campus or golf course.

Two: Profile and be Proactive.

Profile 1: Decay is the number one, pre-existing condition that leads to predictable and unpredictable failures during loading events (wind, ice,

snow) or “silent weather.” Since it’s so common and unforgiving, avoiding or minimizing decay should be part of the management plan. Decay begins with wounding a plant: roots, trunks, branches...all are vulnerable to wounding and decay. Decay reduces the static and dynamic strength of woody tissue and the heavier the woody tissue, the greater the likelihood of failure and resulting damage or injury.

In managed landscapes, the most common causes of wounding can be traced back to maintenance practices that result in unintentional damage to trees. Repeated wounding from lawn mowers and line trimmers ranks as the most common wounding. However, this wounding has the simplest solution: remove the reason for mowing or line trimming close to tree trunks. A mulch ring around the tree trunk works well. If the landscape manager cannot tolerate mulches interrupting the turf, then a band of barren soil around the tree trunk works well using glyphosate or a similar and safe herbicide.



Good grief! Look at the size of those pruning wounds!!! If those branches had been removed 10 years ago, the wounds would have been minimal.

Keep it small and not too close. Oddly enough, the second most common cause of tree wounding is *intentional*: Pruning! Pruning, like anything else can be helpful or harmful. To minimize the wounds left by pruning, prune when

the trees are young and/or the branches are small. Branches that are less than four inches in diameter leave relatively small wounds and smaller opportunities for decay to become a problem. Aim for the smallest wounds possible while still removing undesirable branches.

Never wound tree trunks or main branches. If the pruning wound can be restricted to only wounding the removed branch, the chance of decay spreading into the tree trunk is minimized.

Profile 2: Weak branch attachments

can result in nasty headaches, holes in roofs and lost trees. Remove any branches that develop attachments with *included bark*, the true signal that the attachment is weak. Included bark attachments lack the full tissue attachment that a normal branch



Above, small branches leave small wounds.

attachment has because bark is squeezed down into the union between the branch and the stem. The earlier the offending branch is removed, the smaller the wound and the less likely any damage will result from a split out tree in a wind storm.

Weak attachments and multiple leaders are even more dangerous and more prone to cause grave damage when the tree matures. No large tree should have multiple leaders (well-attached or not) lower than 15-20 feet above the ground. Removing all but one leader when the tree is young and malleable prevents future damage to the landscape and the tree.

On the right, note the small wound made to the branch only on this pruning cut. Removing branches “flush” with the tree trunk leads to decay in the heaviest and most dangerous part of a tree.





Strong Crotch



Weak Crotch



Split Crotch!!! *If this tree would have been trained to a single leader, had the branches with included bark attachments removed when it was young, it would now be healthy, large, relatively safe and useful instead of ...removed.*



A littleleaf linden with stem girdling roots forming below the surface of the lawn. More than 14 inches of the tree trunk was below ground.



In a thunderstorm, this littleleaf linden snapped off at a SGR several inches below ground. Photo credit: Dave Hanson.



Profile 3: Dysfunctional root systems cause most of the tree failures in public spaces. Stem girdling roots (SGRs) are literally roots that fully or partially girdle (aka, squeeze/compress) tree stems and create weak points. Most SGRs occur below ground so the simple corrective action is to avoid something...don't bury stems. If stems aren't buried, SGRs won't be a problem.

The second-most common cause of dysfunctional root systems in trees is due to the partial loss of a root system. With rare exception, this partial loss is due to some type of construction activity: trenching, excavation, sidewalk and curb repair. A tree's overall stability relies on

a balanced root system, one that radiates out extensively. If part of that system is removed for any reason, the tree becomes unstable. The larger the tree, the more unstable it becomes with root loss.

To prevent this damage, minimize or avoid any activity that cuts roots from a depth of 12 inches to 3 feet within the drip line of the tree. If this cannot be avoided and the trenching, excavation or root cutting will be on two or more sides of a large tree, remove the tree before the construction or trenching is done to avoid harm to the landscape or people.



This tree will not stay vertical as it gets larger or if a wind storm hits this town...and it doesn't take a degree in physics to figure this one out!



If this type of damage cannot be avoided, a risk management plan would call for the removal of these unstable trees.

Three: A summary of Do's and Do Not's.

Do: Keep grass away from tree trunks, either with mulch or herbicides.
Prune trees when they are young.
Make the smallest pruning wounds possible.
Prune and wound only branch tissue.
Remove all leaders but one on trees that will become large.
Remove all branch attachments with included bark.
Keep trees healthy. Healthy trees always are more tolerant and recover much better.

Do Not: Wound tree trunks with mowers, line trimmers, nails, chains
Wait until trees are large to prune them.
Prune branches flush to the tree trunk (aka, flush-cut).
Bury tree stems, either at planting time or during grading operations.
Remove support roots within the drip line of a large tree.
Keep large trees that have had their support roots severely

The MGCSA wishes to acknowledge and thank Gary Johnson for his three part series on proper tree maintenance and risk management. Trees, while beautiful and great contributions to the golf course environment, can pose serious threats if not maintained properly.