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Fact sheet

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TREES & UTILITIES:

Cooperative Management Strategies for Success

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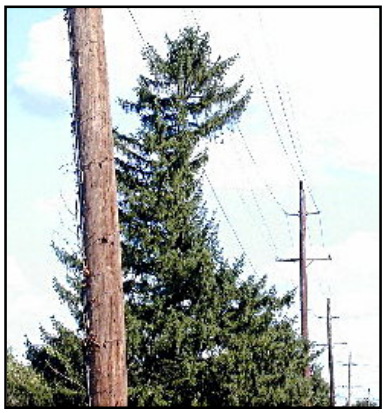
Trees and utilities are two equally important resources for urban and suburban development. However, they can occupy or intrude upon available space overhead and underground, creating a highly competitive streetscape environment. Successful urban forest managers should initiate solutions to tree/wire conflicts that avoid being forced to decide which resource takes precedence — reliable and safe electrical service or an undisturbed community forest. For this reason and more, it is prudent for every community to take a close look at all the current policies and practices affecting their tree resource. Reactive management techniques such as pruning or removal can have dramatic negative effects on the aesthetic quality of the urban landscape. On the other hand, proactive management, including diverse tree selection, planting locations, and line engineering, can increase the longevity and beauty of the urban forest while helping to decrease overall management costs. Urban foresters and utilities need to work closely together to create, maintain, and sustain more compatible environments. Management issues and possible remedies are presented here.



All trees require the proper setback.

Poor choices in species selection and location make for unnecessary maintenance challenges.

Electrical Service vs Trees: Perils of Ignoring the Interface:

Today's consumer demands highly reliable and uninterrupted electrical service. Repeated studies have also shown the needs and benefits for "greening" of communities using traditional and ornamental tree plantings. When the electrical delivery wires pass near or through the canopy of these trees, unmanaged branch growth can create potentially hazardous conditions. These hazards may result in a loss of electrical service from the natural growth characteristics of the tree, from storm or wind damage, and may also result in substantial damage to the tree and electrical distribution equipment. To reduce the risk of severe electrical injury, avoid climbing into trees

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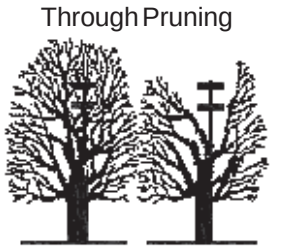
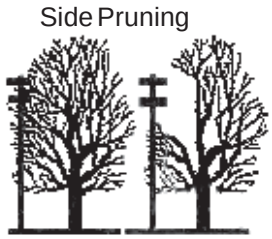
Directional pruning can train the canopy to grow away from or over conductors.

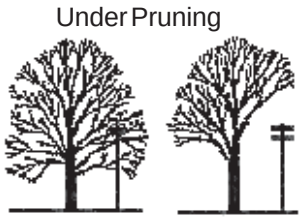
that have wires passing through them. If a fallen tree or limb has brought down a wire, stay clear of the area, as high voltage electricity can be conducted to the ground.

Pruning Techniques and Management:

Pruning techniques, timing, and frequency are all part of managing both tree health and electrical service reliability. Improper tree pruning practices such as topping or rounding over, which are the indiscriminate removal of branches at or to a pre-determined height, may give short term clearance from electrical conductors. Unfortunately, trees often respond to these practices by sprouting weakly attached and superfluous growth that is open to infection, prone to storm damage, and may deplete the tree of its nutritional reserves. Improper pruning practices also increase the frequency of additional line clearance pruning, and may result in a more hazardous condition than originally encountered.

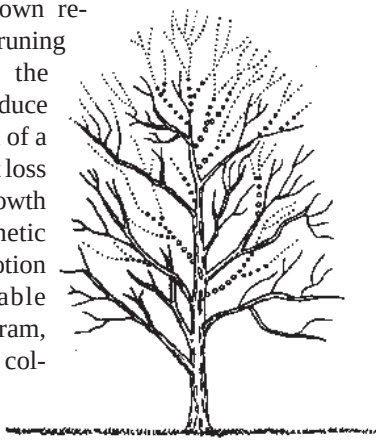






It has been shown that directional pruning (see diagram right), which is the selective removal of conflicting or extending branches that will physically realign the tree's branching pattern as it continues to grow, is a more desirable form of pruning, and allows for "healthier" tree re-growth. Properly implemented, directional pruning addresses the entire canopy, providing for reliable electrical delivery and safety with the removal of interfering (or potentially interfering) growth. The removal of lower limbs, or shelves, typically under the utility line path, will greatly assist the tree's crown in redevelopment over the wires. Over time, this would create a more aesthetically pleasing and naturally shaped tree with fewer holes within the contour of the canopy.

Current national pruning standards strictly define topping as an unethical practice for the proper care of trees. The more appropriate crown reduction and lateral pruning techniques (seen to the right) can properly reduce the height and spread of a tree's canopy without loss of the tree's natural growth characteristics, aesthetic quality, or the promotion of highly undesirable growth. In the diagram, the dotted and lighted colored branches are removed to reduce the height of the tree while retaining its natural form. Using these two pruning methods properly, interfering trees and tree limbs can be reduced in height and spread, giving necessary line clearance with less impact to the tree's natural appearance.



Crown reduction pruning, done correctly as depicted here, can be aesthetically pleasing.

Electrical Line Clearance & Safe Working Distances:

Federal safety standards regulate safe working distances from electrified lines. Sufficient clearance between vegetation and these wires must be maintained to give the trees adequate room for their natural movement in air currents without contacting these lines. Only qualified line-clearance personnel and their equipment may intrude on the mandated safe working distance of ten feet from electrified conductors. Once that clearance between conductors and tree limbs is achieved, it allows for the safe completion of necessary tree-care operations performed by non-utility or non-line clearance certified personnel. Pruning frequency

and extent in and around utility right-of-ways is a direct function of: (1) tree species, (2) tree health; (3) physical configuration or growth habit of the tree; (4) location of the tree in relation to the conductor; (5) type of electrical construction; (6) line voltage; and (7) geographic area.

Properly located & maintained, trees and wires can co-exist.

Prevention - Planning for Success:

Even the most informed and conscientious pruning for electrical line clearance can result in a displeasing or otherwise unacceptable tree, which may result in the removal of the tree. Urban forestry professionals and agencies need to work more closely with the local utility provider in the selection of appropriate replacement species and site location. Municipal Tree Replacement Programs utilize smaller tree species and cultivars to replace the larger, deteriorating trees that were removed. Furthermore, utility engineers need to consider the local or existing tree resource, allowing for trees and potential planting sites when designing and building electrical delivery systems throughout their service area. This would not only minimize future branch/wire conflicts, but would create an extremely beneficial working relationship between the community and the local utility.

A formula for failure: Misplaced trees = loss of aesthetics + increased maintenance concerns.

Community trees and overhead wires need to be properly located in order to minimize the competitive nature of the traditional tree lined street. Urban foresters and planners need to address proper planting locations, being aware of and planning for growth rates and habits, expected maturity size for an urban/suburban setting, and canopy dimensions for proper off-set or side-set from overhead utilities. For example, a wide canopied tree may need to be located inside the sidewalk, unless its mature size and shape will restrict branches away from the wire path.

The right tree in the right place can make a world of difference for years to come.

Multi-stemmed trees such as a zelkova or honey locust can be planted directly underneath utility wires, while oaks and other single stemmed trees should be sited on the opposite side of the street. These trees will still have to be trimmed when they grow into the wire zone. Once pruned, however, their natural growth characteristics can present a more aesthetically pleasing appearance than that of a single leader tree growing directly underneath utility wires. In general, avoiding the monoculture mistakes of the past and utilizing the full extent of the technical and managerial expertise, species choice, location options, and partnerships available to create and maintain a healthy and sustainable urban forest.

Best compromise possible? Good utility pruning for the wrong tree in the wrong place.

Conclusion:

These management solutions for overhead competition are best applied in older, established communities where underground utility locations are greatly restricted, since new communities and subdivisions are increasing the use of underground service delivery systems, greatly reducing overhead conflicts. Underground service delivery systems, however, also present utility service/tree location issues that are equally important for managers to address. Utilizing any of the practices discussed above in cooperation and consultation with your local utility will provide for a safer, healthier, and long lived urban tree resource, minimizing potential maintenance problems and electrical outages. There are many resources that can assist in the selection and care of trees in and around utility right-of-ways. Most importantly, communication, coordination and cooperation between utilities and urban forest managers results in better understanding and a more productive working relationship that improves the quality and reliability of these important resources.

Directional Pruning Line Drawing: Long Island Power Authority

Crown Reduction Line Drawing: International Society of Arboriculture

All other photos by Nick Polanin

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