UTILITY LINE CLEARANCE IN OUR URBAN FORESTS[1]

by Eric S. Ulrich

Electric utilities account for almost all of the tree trimming required by the combined public utility industry for tree and right-of-way maintenance. This paper will therefore focus on the specific need for tree clearance as required for electric lines. Since the time that Edison first strung copper wire on poles to carry electricity to energize his street lights, we have had a conflict between our need for both safe and reliable electric service and tall shade trees where we live, work, and play. The tree-wire conflict was a minor problem in the beginning of this century, but as our population grew, so did our urban and suburban areas. The exposure for tree-wire conflict grew as did our desire to provide the best of both worlds within our available living space.

Concepts, techniques, and materials to minimize the potential for tree-wire conflict in our urban forests should be recognized, planned, and implemented.

How many times have we as professional tree people heard the phrase "By the time that tree becomes a problem—I won't be around to see it?" Or, "If the tree grows that big, it will be somebody else's problem." Or, one that we utility arborists are more familiar with than other arborists, "I planted it there so that the electric company would have to take care of it."

Unfortunately, many people think tree trimming is a "free service" offered by their friendly neighborhood electric company. We should remind them of the oft used and well worn axiom, "There is no such thing as a free lunch!" Everybody pays for tree clearance in their electric bills.

The electric utility industry in the United States spends about one billion dollars annually to keep trees away from their electric conductors and to provide access to their facilities for maintenance. A large part of that annual cost is for the pruning clearance required from trees within our urban forests.

Electric utilities require far more stringent tree clearance from their electric conductors than telephone, TV cable, and other overhead line utilities. One reason is because of the threat to public safety from accidental contact with energized lines. The potential for children or other tree climbers to contact electric lines is ever present. Likewise, the potential for energized lines to be burned, torn, or pulled off the poles by trees represents a significant hazard to the public. Electric utilities are very much aware of their responsibility to minimize the potential for public contact with their electric lines.

Another reason is the demand for uninterrupted electric service. Most electric utilities report that tree-caused interruptions are one of their most frequent causes of power interruptions. Many report that trees are their number one cause. Tree-caused interruptions of electric service vary from the aggravation of having to reset the digital clock on your microwave oven to stoppage of life-sustaining machines of medical patients. A tree interruption is as simple as flickering lights when reading the evening newspaper and as complex as a lost day of production to a major industrial manufacturer. The bottom line is that electric utilities prune many millions of trees annually to satisfy their customers' demands for uninterrupted electric service.

Electric utilities therefore prune many amenity trees as well as forest trees as an integral and necessary part of serving electricity to their customers. This puts electric utilities in a rather unique position. We prune trees because WE MUST, not because WE WANT TO. Most electric utilities purchase their tree pruning services from tree contractors. Most other major purchasers of tree services do so for the purpose of tree health,

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aesthetic beauty, or other function that is usually beneficial to trees.

One of the major complaints by some tree professionals regarding electric utility tree pruning practices is the deformation to the natural shape of trees. This complaint is legitimate whether the electric lines run along the side, through, under, or over our urban trees. I have yet to see electric line pruning practices that do not alter the natural height, shape, or appearance of any tall-growing tree species. However the tree is pruned to alleviate the tree-wire conflict, alteration of the tree is inevitable. Whether your local utility is pruning big leaf maple, pin oaks, silver maples, Shamel ash, aspen, Norway maple, sycamore, live oak, or Australian pine, wire clearance disfigures the natural shape of the tree.

Another common complaint made regarding the electric utility line clearance industry are their pruning practices. Here is one area where most electric utilities have made vast improvements. Before the Second World War, many electric companies pruned trees with line crews. Their purpose was singular and brutal clearance from the wires. As line clearance demands grew with the vastly expanded electric system, most utilities hired professional tree expert services. The tree expert companies improved the quality of our European pollard techniques for line clearance. The term "round-over" became synonymous with contract line clearance and remains with us today in some areas. During the last two decades, most electric utilities have incorporated lateral, dropcrotch, or natural (all are synonymous) pruning practices to restrict the height or alter the shape of trees requiring clearance from their electric lines. This has eliminated most of the stubbing and much of the "same height" pollarding practices of the past.

Although many utilities have a one-third diameter lateral standard, it is not enforced as judiciously as it should be. This is especially true on pruning cycles that are too long. Likewise, pruning too many small branches off the main branches "bares" the trees and spurs even greater adventitious regrowth. These two areas need our attention.

Electric utilities construct overhead lines to provide safe, economical, and reliable electric service to all of us in our urban and suburban environments. Trees for shade and aesthetic beauty are an integral part of that same environment. The natural conflict between our trees and our wires can be minimized in several ways.

Planting Trees

Tall trees. Do not plant tall growing trees that would exceed 50 foot mature height growth within 30 feet of the nearest overhead electric line.

Medium trees. Do not plant medium height trees that would exceed 30 foot mature height growth within 20 feet of the nearest overhead electric line.

Small trees. Trees that have a mature height growth of less than 30 feet may be planted aside of or possibly under the overhead electric lines.

Planting trees by these guidelines will recognize the available growing space and reduce the potential for conflict with overhead electric lines.

Existing Trees

When existing tall or medium height trees are already present under electric lines, the available options to reduce tree-wire conflicts must be addressed.

Prune. *Repetitive* and *costly* are two terms used to describe this pruning process. *Disfiguring* and *displeasing* are two other terms that may also accompany the first two.

When pruning is the only option to alleviate tree-wire conflicts, several good arboricultural practices should be followed to provide adequate line clearance while maintaining the best possible appearance and tree health. Lateral pruning practices that require "Shigo" cuts to laterals at least one-third the diameter of the branch removed is a good start. Regular pruning on cycles from 2 to 4 years will help to assure that the maximum number of live laterals providing leaf surface or buds will remain on the pruned trees. Pruning should begin well before a tree-wire conflict arises. This will allow successive pruning cycles to maintain adequate wire clearance without removal of large branches. Radical pruning to re-establish line clearance from trees allowed to grow into wires (having too long a trimming cycle) should be avoided. Removal of many large branches at one time initiates significant and rapid sucker growth

by the tree to re-establish the lost leaf surface. The sooner a tree can be pruned to remain below or have clearance from electric wires, the more desirable the appearance that can be afforded to the tree. This will also provide the greatest linear clearance from the electric wires. Although bucket trucks may be convenient, good quality lateral pruning is best done with conventional tree climbers tied into the tree. The physical limitations of the tree worker in a bucket trying to reach 6 or 10 feet inside the crown canopy of trees to make proper lateral cuts, is difficult if not impossible.

Tree growth regulators may soon become a valuable new tool to extend our line clearance pruning cycle on amenity trees. Clipper, Cutless, and Prunit are names of products aimed at reducing the length of tree growth. These anti-gibberellins allow normal bud and near-normal leaf development but stack them close together on a much shorter stem. The potential of these tree growth regulators is very good indeed. They present a significant potential to reduce the number of times our urban forest trees must be pruned for line clearance.

Where tall growing trees exist under electric lines from prior poor planting practices, tree growth regulators represent a far better choice than repeated pruning. If our urban forest trees that conflict with electric wires could be pruned every five to ten years instead of every two to four years, wouldn't everybody benefit? Trees inhibited by anti-gibberellins exhibit tight form, thicker foliage, and a deeper green appearance. Trees that are treated when pruned will usually have their terminal and vertical sucker regrowth by more than 50% in the first year. Carryover effect is usually two to five years thereafter. Tree growth regulators have particular potential on tall growing species that are also very fast growing and difficult to maintain near electric wires. We have much to learn about the best application methods for these innovative growth regulators. We may eventually learn how to keep tall growing trees from conflicting with electric wires by repetitive treatment rather than repetitive pruning. This possibility offers both an aesthetic improvement to the long term appearance and health of our urban trees and improved and more economical electric service.

Tree Replacement

As mature tall-growing tree species decline in vigor or are being considered for removal for other reasons, tree replacements should be made with compatible tree species. Some electric utilities work cooperatively with the municipalities they serve to assist them in removal and replacement of trees under their electric wires. Replacement is made with trees that have a lesser mature height growth, such as the small trees mentioned earlier. These small trees are usually more compatible with other restrictive parameters for urban tree growth such as planting square size, area available for root spread, durability to adverse conditions, and other physical or environmental constraints imposed on our amenity trees. Shigo calls it "space to grow" and we should all recognize the limitations of the available space when we choose tree species. Our landscape and nursery producers' quick fix mentality for instant shade should be corrected for more desirable long-term goals.

A good compromise is usually the best solution to most issues that have diverse opinions from two sides. One extreme insists that trees should never be altered from their natural shape to be compatible with electric wires. The opposite side wants all tree growth eliminated from anywhere near electric wires for the cheapest, safest, and most reliable electric service. Our job within the Society of Arboriculture is to design the best compromise attainable to both sides. The Utility Arborists ask that all of you in the Municipal, Research and Education, Commercial, and Student interest groups help us work out the most compatible compromise. Together we can provide for the maximum benefit from our urban forest trees and the least conflict with electric wires. Together we can continue to serve our combined needs for safe, reliable, and economic electric service within a pleasing tree studded urbar forest.

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