MANAGEMENT TECHNIQUES FOR
UTILITY TREE MAINTENANCE

by Richard A. Johnstone

Abstract. Maintenance of trees growing near electric
distribution facilities is one of the highest annual maintenance
expenses experienced by utilities. It is also usually the first
area to receive budget reductions during lean years. Most utili-
ty foresters would say that funds are simply inadequate to pro-
perly maintain facilities for service reliability. However, present
funds can be stretched if proper management methods are in-
stituted, such as proper scheduling of crews, trimming trees
by the lateral method, problem tree removal and/or replace-
ment, and the use of growth regulators.

Utilities have been trimming trees growing near
their distribution facilities for over 50 years. Dur-
ing this time, much research has been conducted
and funds expended to find better, more efficient
equipment to trim trees. The advent of the power
saw and hydraulic lift equipment has revolu-
tioned the tree maintenance industry, resulting in
work being performed more efficiently and
economically. But inflationary times have eroded
tree maintenance budgets with corresponding
erosion of electric service reliability. Experience
has shown that utilities are reluctant to increase
maintenance budgets and, during periods of high
interest rates and capital expenditure needs,
these budgets are often slashed. With these
forces working against him, the utility forester
often finds his maintenance plan in a hopeless
downward spiral. Continuing uncertain economic
conditions hold little promise that this situation will
change in the near future.

Rather than simply despairing, the utility
forester needs to take a closer look at the
maintenance practices being used. Areas which
need to be scrutinized are: 1) the scheduling of
crew work by district personnel, 2) trimming trees
by property owner request, 3) shearing trees
because that method requires few manhours or
training, 4) automatic trimming instead of remov-
ing problem trees, 5) the absence of techniques
to decrease tree growth.

Crew scheduling. The scheduling of crew work
by district personnel involves planning or, as is
often the case, the lack of planning. District per-
sonnel, whether they be managers, supervisors,
or foreman, are usually only concerned with prob-
lems of their immediate district. They do not have
an overview of the entire system. Thus many of
their decisions concerning maintenance are short-
sighted. To be effective, right-of-way vegetation
maintenance requires central planning where the
individual trained in vegetation management can
decide where tree crews should be dispatched by
using interruption reports, customer density, line
voltage and circuit fusing criteria. In this way
maintenance is performed according to the needs
of the system and not according to the needs of
those individuals who complain the loudest.

Owner request. Although public relations is a
large part of maintenance trimming, the primary
purpose of maintenance is service reliability. Trim-
ing trees at random because of owner request
does absolutely nothing for reliability. If all the
trees on a circuit are “burning” (contacting the
electrical conductors) and only one is trimmed,
the line is still unreliable, because any one tree on
that circuit can cause the next interruption. Unless
trimming is performed circuit by circuit instead of
tree by tree, the reliability of the system will never
improve and, in fact, it may deteriorate.

To improve the reliability of an electrical system,
long range plans must be implemented. These
plans begin with the type of trimming being per-
formed. Many managers are only concerned with
the speed in which a crew trims a designated
area. The primary measurement of crew efficiency
has been tree count. But what has a crew ac-
complished if the thousand trees trimmed this
year are again interrupting the circuit next year.
When a crew is only concerned with quantity,
then quality suffers.

Trimming Methods

Shearing. Quantity often involves the use of
shearing and pollarding trimming methods. With

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the shearing method, a previously untrimmed tree (Fig. 1A) is sheared by making saw or pruning cuts on an imaginary plane across the tree resulting in a “rounded over” look (Fig. 1B). This rounding over produces many more problems than it solves. The randomly placed cuts produce stubs on the branches. New growth cannot occur from the stub but instead sprouts below the cut. The sprouts form from adventitious buds on remaining limbs and the stub portion dies back. The sprouts grow rapidly often outgrowing the line clearance achieved through the trimming. Thus in one growing season, the reliability obtained through trimming may be negated.

Shearing also compounds the problem because where one branch had been growing there are now several sucker sprouts in its place (Fig. 1C). Not only are they numerous and rapid growing, they are also weak, being easily whipped by the wind into the conductors. The dead stub resulting from the shearing also adds to future problems by providing an avenue for fungi, insects and disease to enter the plant. The tree is then further weakened, increasing the chances of limb breakage during wind, ice and snow storms. Subsequent trimming cycles multiply the problem because the trimmer usually places his saw for cutting above the stubs of the last trimming since dead stubs are difficult to saw through (Fig. 1D). This in turn produces more stubs, more sprouts, greater chances for plant infection and a further worsening of the system’s reliability.

Lateral or natural. A preferred method is one in which a tree is trimmed by making “lateral” cuts. The name “lateral” is derived from the method of cutting branches back to the next limb or lateral growing branch. In the case of a tree growing directly under a distribution line, the terminal leader is removed by “dropcutching” to the fork of the tree (Fig. 2A). The branches growing laterally from this point are then selected and additional cuts are made farther out on each branch. Subsequent growth does occur, but it is not accompanied by profuse sprouting and the laterals tend to direct the growth away from the conductors (Fig. 2B). Another trimming cycle refines this process and improves on the shape of the tree (Fig. 2C).

This same method may be used when a tree is growing near a distribution line but is offset and not growing directly beneath it. The tree is trimmed by making lateral cuts on only those branches which are threatening the conductors (Fig. 3A). Branches growing above the conductors are directed up and back while those below are directed down and back. The next season’s growth is then concentrated in the direction the lateral cuts were placed (Fig. 3B). Future trimming cycles again refine this procedure and improve the shape of the tree (Fig. 3C).

Economics

What is the cost in terms of production? Initially it takes a trimmer longer to trim laterally, because
he must think of where to place his saw instead of arbitrarily cutting. In a relatively short period of time, depending on the crew's skill, production approaches or equals that of shearing. The real benefits, however, are realized in subsequent trimming cycles. While shearing may be quick and easy, it increases the amount of wood that needs to be removed each trimming cycle because of the profuse sprouting which this method causes. Lateral trimming, on the other hand, results in the same number or fewer cuts with each cycle, because the problem branches are completely removed back to lateral branches whose growth does not threaten the conductors. Subsequent trimming is simply a refinement of this process.

As time goes on the economic benefits of lateral trimming become more pronounced, because the controlled directional growth of the trees extends the period of time between necessary trimmings. This permits the vegetation manager to expand...
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regular maintenance trimming to rural, less concentrated areas of his system and to do so on planned maintenance cycles rather than by hot-spotting. In time, the number of interruptions due to trees can be reduced throughout the electrical system.

The natural look achieved through lateral trimming is also more acceptable to the public than shearing or "butchering" of trees, as the latter method is often referred to. The manager will find that the number of refusals for and complaints about trimming are drastically reduced. Good public relations cannot be priced, but it is nonetheless very important.

**Tree removal and replacement.** Another area that should be addressed and can extend a maintenance cycle and improve public relations is tree removal. A common criterion given to crews to decide whether or not to remove a tree is: "If it takes no more than twice as long to remove the tree as to trim it, remove it, otherwise, trim it:"

Why? If a tree is a problem, requires regular trimming and has or may cause an interruption, why trim it? These trees should be targeted for removal, especially if the property owner requests it. Similarly, if a tree is a definite hazard to the electrical facilities and the property owner is not receptive to its removal, tree replacement should be endeavored. The removal of large, over mature and often diseased trees and their replacement with low growing ornamental species not only improves service reliability and lowers maintenance costs, it also improves the aesthetics of the city street and the public image of the utility.

**Tree injection.** A final area which has received little attention is the implementation of improved technology. While mechanical aids have not advanced much past the power saw, chemical aids have made recent strides forward. Chemical growth regulators can be used to extend trimming cycles on certain species of trees, especially if combined with lateral trimming.

Delmarva Power has experimented with various growth regulators for the past two years, primarily on the American sycamore, *Platanus occidentalis*. The chemical which has shown the most promise so far is dikegulac. Dikegulac is injected into the tree following trimming and when the tree is three-quarter to full leaf. While long-term effects are unknown, short-term effects are very promising and seem to justify the cost of injection, $6 to $12 per tree.

In the past, sycamore trees were trimmed by shearing and required annual maintenance. In 1980, sycamores were trimmed by the lateral method and some were selected for injection with dikegulac. The control trees laterally trimmed will require another trimming in 1983, a three-year maintenance cycle. The trees laterally trimmed and injected appear at the present time that retrimming will not be necessary until sometime in 1984 or 1985, a four to five-year maintenance cycle. The net result is that lateral trimming effectively decreased maintenance expenses for sycamores by 200 percent in terms of extending the trimming cycle and stretching the budget dollars. Lateral trimming coupled with dikegulac injection promises to decrease these same expenses by 300 to 400 percent.

**Summary**

Trimming trees for reliability of electric distribution systems is a costly maintenance procedure operating under increasing budgetary restraints. To continue to provide reliable service, the utility forester must improve management techniques. Proper scheduling of maintenance crews, the use of lateral trimming, tree removal and replacement, and the use of chemical growth regulators are some of the methods which, if used properly, can extend maintenance cycles and, in effect, increase the value of the maintenance dollar.

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