

CREW ORGANIZATION, UTILIZATION AND LOCATION¹

by Charles H. Miller

Abstract. There have been few if any major advances in line clearing efficiency since the development of the bucket truck and chipper. One approach to more effective line clearance lies with proper crew organization, utilization and location. Public Service Indiana has attempted to address these factors to best suit its needs.

Our goal as utility arborists is to provide safe, economical, environmentally sound line clearing to ensure reliable service to the consumer. Perhaps our greatest challenge is the quest for greater efficiency.

The greatest, most direct potential increase in line clearing efficiency was realized almost thirty years ago with the advent of the bucket truck and chipper. Until about 1975 line clearing costs on our system rose rather slowly. Since then we have had a dramatic rise in line clearing costs. However, rising costs are not unique to line clearing nor are the underlying root causes. Today, faced with double-digit inflation, out-of-sight fuel costs and public opposition to rate increases, the economics of line clearing programs are coming under closer scrutiny within many companies.

One avenue open to us in our search for ways to improve line clearing efficiency is in the area of crew organization, utilization and location. Because these factors are flexible, they can be manipulated to fit a variety of situations and needs. I will review how we approach these factors at Public Service Indiana.

There are two approaches to obtaining competent line clearance crews: 1) full-time utility company crews, and 2) line clearance contractor crews. Each source has advantages and disadvantages to be considered in determining the type of crew best suited to particular needs.

Many years ago PSI opted to go with the line clearance contractor concept and has pursued this approach for the following reasons: the use of contract crews allows considerable operational flexibility: (a) a variety of contractors, from lump-sum, firm bid to cost-plus agreements, can be

negotiated to fit the company's needs, (b) crew and manning requirements can be changed with relative ease. Also, the company is relieved of the problems inherent to owning line clearing equipment in addition to its line service equipment.

Public Service Indiana employs line clearing crews furnished by four contractors: Asplundh Tree Expert Company, N.G. Gilbert Corporation, Nelson Tree Service, Inc. and Townsend Tree Service Co., Inc.

PSI serves over 500,000 customers in 69 of Indiana's 92 counties. Our service area covers approximately 22,000 square miles. To meet our line clearing requirements we have a staff of six foresters planning, scheduling and monitoring the activities of from 55 to 65 contract line clearance crews working on our System year around.

The contractors bear the full burden of personnel and equipment problems leaving our foresters free to perform other administrative and supervisory duties. Our primary line clearance contracts are negotiated on the basis of man-hour and equipment-hour rates. This we feel gives us greater flexibility to make timely changes in the number, size or type of crew when conditions warrant and affords us operational flexibility, as men and equipment can be added or removed on relatively short notice. Some work is performed under firm bid and unit price contracts.

Crew organization. In any crew organization the foreman is the key to efficient operation. This is especially true with the line clearing crew where the foreman's role is quite complex. He must be, among other things, an administrator, an educator, a PR man, a safety engineer and, above all, a leader. Our goal is to not only develop competent foremen but to also develop proficient personnel within the crew organization.

By agreement our manning classifications fall into several categories. From the top they are: working foreman (WF); tree trimmer (journeyman) (TT); and trainees (T-1, T-2, T-3, and T-4). When

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crews are formed, or when manning vacancies are to be filled, the contractors must notify PSI in writing of the names, classifications and work experience of the individuals involved. To aid meeting this requirement, the Personnel and Classification Change Notice is used. The notice is prepared by the contractor and submitted to the applicable forester who, upon approving the notice, files it for future reference.

To promote the development of competent line clearance personnel, PSI instituted a promotional system in 1972. This system permits a tree trimmer trainee to become eligible for promotion to the next higher classification every six months provided he has exhibited proficiency in the skills required by his present classification. The determination of an individual's proficiency and his readiness for promotion is made by his foreman and the foreman's supervisor. A change notice is prepared by the foreman and sent to the forester, who may elect to observe the individual's proficiency himself before approving the promotion. We feel that our personnel selection and promotional system has aided in the development of a more competent line clearance crew organization on the PSI system.

Crew utilization. We estimate there are over 400,000 trees on the Public Service Indiana system which are routinely trimmed every two to three years, and approximately 32,000 trees are removed each year. In addition, over 100 miles of fencerow brush is cut and/or chemically treated annually. The PSI system contains about 19,000 miles of overhead primary distribution line and over 5,000 circuit miles of major transmission line.

Approximately eighty percent of our overhead distribution system is located alongside roads, as is about one-fourth of our transmission network. Therefore, the bucket truck is the backbone of our tree trimming program. Climbing crews provide tree trimming on the remaining twenty percent of our distribution network located on easement strips and private rights-of-way. Line clearing work on our cross-country transmission lines is performed by more specialized ROW maintenance crews, mowing crews and aerial and ground spray crews.

In the early 1970's we developed a distribution line clearing program based on the Trim Area concept, and we implemented a computerized method for the storage and retrieval of our line clearing data. Our primary objective was to achieve a two-year trim cycle while operating within our normal budget parameters. We realized early on that only through effective crew placement and utilization could we come close to realizing our objective.

The Public Service Indiana system is divided into three operating Divisions. The divisions are further divided into operating Areas, which are subdivided into operating Districts. For line clearing purposes, the districts are also divided into Tree Trimming Areas and work in the various trim areas is reported on a Weekly Line Clearing Report. The foresters, at the division level, administer the line clearing policy as determined by the Right-of-Way Maintenance Section located at General Headquarters. They work with the various area and district superintendents to assure that the trim area schedules are followed.

The superintendents are responsible for assigning work to the distribution tree trimming crews on a daily basis. The work assignments may involve routine trimming, emergency storm work, miscellaneous ticket work including trimming on roadside transmission lines at locations turned in by company helicopter patrols.

We have found that the most efficient use of tree trimming crews is achieved by developing and adhering to a schedule that is based on such priorities as line voltage, customer density, tree density and predominant species. Our experience shows us that a trimming program based on "hot-spotting" ultimately costs more and all too often results in a slow decay of service reliability and should be used only as a temporary stop-gap measure to eliminate an immediate problem.

More efficient use of tree trimming crews can also be realized when miscellaneous tickets are closely screened to eliminate unnecessary jobs before they are given to the trim crews to work. Those tickets that must receive immediate attention should be given to a trim crew, which returns to its scheduled trimming location on completion of the ticket work. Less critical tickets should be

held until a crew is scheduled to work in the trim area where the ticket work is located.

We have found that using the right type of crew (i.e., bucket, climbing, etc.) to perform the work required is essential. We normally use 3-man bucket crews to perform roadside work. Easement strips and sections of private right-of-way are generally trimmed out by 3- to 4-man climbing crews. Combination crews are rarely used and then only for special jobs such as those requiring flagmen or involving large removals.

Public Service Indiana considers line clearance an integral part of its overall maintenance program, therefore when budget restrictions require a reduction in line clearing forces, we attempt to leave all tree trimming crews with three men. In rural areas and in some towns with light tree density, 2-man bucket crews may operate effectively, but in general we believe that 3-man crews are essential for efficient operation. On occasion we have found it necessary to totally curtail the operation of one or more crews in order to retain other crews at 3-man strength.

In an effort to maximize effectiveness of available crews we have developed a distribution line clearing plan using current outage data, accepted tree trimming practices and minimum tree clearances necessary for a two or three year trimming cycle.

Crews are placed in those trim areas having the highest incidence of tree-related outages or having the greatest number of customer minutes involved in outages. Trim area schedules are prioritized on this basis and crews are assigned to work in the various trim areas on the basis of decreasing priority.

The basic types of trimming performed and clearances obtained depend on the relative importance and voltage of the line involved. Where service drops are involved, we trim for swing clearance only and no removals are permitted without approval of a company representative. We recommend no topping or round-overs for secondary lines. We stress only side trimming and "V" trimming. Again, no removals are permitted without company approval.

On single phase and two phase lines (7.2 KV-12.5 KV) we attempt to obtain at least

minimum clearances as set forth in the code. Overhang removal in excess of minimum clearance is specified only to a height permitted by the bucket truck. Where permissible, only selected dead trees adjacent to the lines and trees growing directly under the lines are removed.

Line clearing requirements on three-phase lines (12.5 KV-34.5 KV) vary according to the importance of the line. Storm-proofing of critical trees deserves consideration. On other, less important lines overhang removal is required, and very selective storm-proofing may be performed. On all three-phase lines, removal of only selected dead trees adjacent to the lines and trees growing directly under the lines is required, where permission is obtained from the property owner.

We believe there are several economic benefits to be gained from a properly organized distribution chemical growth control program in rural areas and allocate approximately \$250,000 of our Distribution Line Clearing Budget to chemical growth control. We feel that the primary benefit is the long-term reduction of a high volume of stems in a relatively short period of time as compared with shorter-term elimination of an immediate tree problem by trimming. In other words, there will be fewer trees to be trimmed in the future.

We deal with our rural tree and brush problems in two ways. Tree trimming crews are expected to obtain permission from property owners to cut and chemically treat the stumps of isolated trees and scattered brush in fencerows. More dense rural tree and brush conditions are handled by special distribution growth control crews which are prepared to make foliar, basal and injection treatments where permissible. These crews normally consist of three men and a two-wheel drive pickup truck equipped with a low-pressure sprayer, basal and foliage spray guns, injectors and a chain saw.

One problem we've encountered involves the chemical treatment of brush over ten feet tall. While most property owners permit chemical treatment of brush under fencepost high, many often object to the use of herbicides in controlling brush over fencepost height because it looks unsightly and may eventually pull down their fences.

To overcome this problem our 1981 program includes the use of a combination spray-cutting crew. This crew will probably consist of a normal 3-man crew equipped with a split-dump truck, a chipper and the usual tools necessary to perform trimming and removal work. Our intent is to have the spray crew handle situations where small brush is encountered. Taller brush and small trees will be removed and the stumps sprayed by the cutting crew. This effort should permit the spray crew to continue work without having to spend time on less productive jobs.

Our roadside transmission lines are trimmed to standards that include storm-proofing and, where permissible, removal of all danger trees adjacent to the lines and removal of all trees growing directly under the lines.

Our transmission line right-of-way maintenance program is based on a 4-year cycle. In order to meet this objective we use contract ROW maintenance crews working year round. They are equipped to handle routine trimming, removal and chemical work. Aerial spray, ground spray and mowing crews are used to supplement the ROW maintenance crews on a seasonal basis.

In addition to the normal "work in progress" contacts, a more formal type of inspection is made periodically by the foresters to evaluate work quality, safety and equipment maintenance of both tree trimming crews and ROW maintenance crews.

Crew location. Assuming that crews have been properly organized and utilized, there remains one more area of emphasis; putting the crew where the work is.

Excessive travel time and frequent crew relocations within a given work day, are inefficiencies that can be reduced by careful selection of work headquarters. Left uncorrected they can be very costly in terms of money and time lost. For exam-

ple, if a 3-man bucket crew costing \$40.00 per hour could be saved fifteen minutes travel time each day for one year through effective location to the field headquarters, the cost saving would be \$10.00 per day, \$50.00 per week or \$2,600.00 per year. Carried through for, let's say, fifty crews, this savings at the end of one year would be \$130,000.00. That's almost two more crews, and for only fifteen minutes a day!

In an effort to assure proper crew placement, we developed the Daily Crew Activity Log. This log is prepared by our superintendents to record daily crew work locations. The log gives our foresters and the contractors a guide to follow in reviewing the travel time and relocation frequency of the individual crews. We try to contain travel time from work headquarters to the work area to 30 minutes; this is accomplished by establishing a new work headquarters when travel time exceeds 30 minutes.

Of all the line clearing factors to consider, perhaps none is easier to control or had greater economic impact than the proper location of crew headquarters.

Summary.

Although no revolutionary equipment or methods have entered the line clearing industry in recent years, the avenue of crew organization, utilization and location is open to us in our search for ways to improve line clearing efficiency.

I have certainly not offered a panacea for everyone's line clearance problems but merely related how we at Public Service Indiana have implemented some ideas in attempting to achieve greater crew effectiveness.

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