

# THE LONG ISLAND LIGHTING COMPANY PRODUCTIVITY INCENTIVE PROGRAM FOR TREE TRIMMING<sup>1</sup>

by Thomas F. David

The Long Island Lighting Company (LILCO) has developed a work measurement system and a productivity incentive program to measure and improve crew performance on its distribution line clearing operations. The purpose of this program is to improve the overall cost effectiveness of the Company's tree trimming operations.

LILCO engages contractors for its tree trimming operations. Approximately fifty percent of its tree trimming budget is expended on program retrimming operations. The contractors use two-man aerial lift crews for highway work and four or five man climbing crews for off the road work. The manhours required to complete work on pre-selected one quarter square mile map sections and line segments are estimated in advance and issued to the contractor who is given a free hand in scheduling and completing the work in the field. If the contractor completes the work in less than the estimated manhours, the crew members are paid a bonus.

The design of a measurement system to be used in monitoring crew performance requires two basic items. The system must have adequate labor standards and an estimating method that can predict the manhours required to complete a measurable quantity of work. Over the past six years LILCO has used different historical estimating procedures. The Company's first estimating method was based on counting the number of trees to be trimmed and applying a historical factor of manhours per tree. This method proved to be ineffective mainly because it was difficult to obtain an accurate count of the number of trees requiring trim. After the use of tree counts proved to be ineffective, an estimating system based on environmental coding was adopted. This method involved classifying areas in

the field into four major categories and a series of minor categories. The major categories used were: tree density, type of trim labor, trim location, and customer density.

Historical factors of labor manhours per foot of line were developed for each code. Manhour estimates for each job were obtained by coding the different areas of the job in the field, recording the circuit feet of line to be trimmed and then applying the manhours per foot of line factor to each code. At the time the environmental coding system was adopted a bonus incentive agreement was reached and implemented with the tree contractor. This agreement provided for a bonus to the contractor if the work on a job was completed in less than the estimated manhours and a penalty paid by the contractor if the manhours spent completing a job were greater than the estimate. A portion of the bonus monies paid to the contractor were passed on to the crew foreman who performed the work. To ensure that work quality remained at a satisfactory level the contractor provided the Company a two year warranty on each completed job. This warranty specified that any call back trim in the area completed on the job would be performed by the contractor at no cost to the Company.

The environmental coding method was used for several years and proved to be a significant improvement over the tree count estimating method, but it still was not as effective as had been expected. The resulting crew performances were not consistent. A crew would perform highly on one job and low on the next job for no apparent reason. In addition, the incentive program was ineffective in that even highly rated crews lost interest in the program because they did not feel that they had a fair chance of earning a bonus.

---

<sup>1</sup>Presented at the annual conference of the International Society of Arboriculture in Toronto, Ontario in August 1978.

In 1974 the Company engaged a management consulting firm to assist with the upgrading of its retrimming program. Specifically, the consultant was requested to evaluate the Company's retrimming program, develop labor standards, and an estimating method for tree trimming.

The consultant observed and studied both tree trim contractors and LILCO's supervision of the program. Over fifty time studies were conducted in the field. These studies were made on both lift and climb crews during both the leafy and dormant seasons of the year.

The time studies and observations made by the consultant showed that in general the LILCO program was successful and that there was room for a significant improvement in crew performance. Specifically, the consultant indicated that crew performance levels could be raised by improving the utilization of available time, employing only trimmers on climbing crews and improving the incentive agreement.

After studying these recommendations, the Company decided to proceed with the development of labor standards, an estimating method and an improved incentive program.

The time studies conducted by the consultant isolated over thirty-five individual activity elements for both types of crews. Labor standards were developed for each activity element using the time study data.

Using these labor standards and other information from the time study data, the consultant developed two estimating methods. The first method, called the weight method, is based mainly on the pounds of wood chips produced on each job. With the weight method the truck is weighed daily and the crew foreman makes a daily report of the number of pole sections trimmed and the number of set-ups the crew makes. A set-up is the activity required for a trimmer to get from the ground to his working position in a tree. In the case of a climbing or manual crew, this means either climbing a ladder or climbing the tree. In the case of a lift crew, it means setting up the truck in position to trim the tree. Other determinants are recorded from a map in the office where the performance for the day for the crew is calculated.

The weight method was used successfully for nine months with various crews. The performance

results correlated well with time studies that were run concurrently and the performance of crews was consistent with prior judgments of their performance levels (highly rated crews performed better than poorly rated crews). In addition, the performance of individual crews was fairly level from job to job.

The disadvantages of the weight method are that it requires a close audit of the determinants reported by the crew, it provides no estimate in advance of the work, and it was found that crews became "weight" conscious. Field observations showed that as crew members became aware of the importance of the weight of chips in determining performance there was a tendency to trim to produce maximum weight. This sometimes resulted in improper or over pruning.

The second estimating method developed by the consultant is called the back-cut method. The development of this method was pursued and its use subsequently adopted due to the disadvantages of the weight method. The major determinant of the back-cut method is the number and size of back-cuts in lieu of the pounds of chips used in the weight method. A back-cut is defined as the last cut made by a clip or saw to remove a limb from a tree. The other performance determinants of the back-cut method are identical to those of the weight method.

With the back-cut method, an estimate is calculated in advance of the work using data gathered by a field observer and taken from a facility map of the work area. The field observer predicts or estimates the number and size of back cuts required in each tree and the estimate of pruning manhours is calculated using tables compiled from time study data. Different data tables are used for lift and climb crews and for leafy and dormant seasons. The field observer also estimates the number and type of set-ups required for each tree.

The back-cut method was tested and refined over a one year period. Over forty test jobs were completed using the back-cut method. By the end of 1976 the results achieved using this method were considered to be satisfactory.

On April 1, 1977 a new bonus incentive agreement was implemented with each contractor using the new back-cut estimating method. This agree-

ment is designed to provide incentive for the contractor and his field personnel to improve productivity with a corresponding savings to LILCO. The new agreement also retains the warranty provisions of the previous incentive agreement. The major points of these new agreements are:

1. Separate manhour targets (estimates) are issued to the contractor for the lift and climb portions of each map section.
2. Estimates are computed using a sampling technique in the field and then extrapolating to arrive at an estimate for the entire job.
3. Estimates are adjusted up to allow contractors to improve their performance gradually over a period of time.
4. There are no penalties for work completed in excess of the targeted manhours.
5. Contractors are paid a bonus for jobs completed in less than the targeted manhours on a sliding scale based on the percent underrun as follows:

Actual Manhours as a % of Target	Bonus
90%-100%	\$3.50/MH (3)
80%-89.99%	\$5.00/MH (2)
0%-79.99%	\$6.50/MH (1)

- (1)—100% of approx. average direct labor rate  
 (2)—75% of approx. average direct labor rate  
 (3)—50% of approx. average direct labor rate

6. Bonuses are computed and paid to the contractors on a monthly basis.
7. All bonuses are disbursed to crew members and general foremen by each contractor according to their own payment schedules. However, each crew member must share in the bonus and no more than twenty percent of the total bonus can go to the general foreman. No part of the bonus can be retained by the contractor.
8. Each contractor stands to lose or gain in his share of the total crew compliment for the following year based on his performance for the current year.

In general terms the results to date of this program have been moderately successful. At its inception the performance measurement system showed that average crew performance levels were low. Climb or manual crews were performing at lower levels than lift crews. The program was adversely affected to a serious extent in August of

1977 when budgetary considerations caused a curtailment in the retrimming program resulting in a layoff of approximately thirty percent of the field personnel. The men in the field attributed the layoff to the new productivity program and believed that they would be working themselves out of a job if they improved their performance.

Between April 1, 1977 and June 30, 1978 138 jobs have been completed. Thirty-four or approximately twenty-five percent of the jobs have been completed in less than the targeted manhours. Although the 1977 results are inconclusive, the monthly results for the first six months of this year indicate an upward trend in performance for both lift and climb crews. While the trend is only slightly upward for the climb crews, the trend for the lift crews shows a significant improvement.

Many of the men assigned to lift crews now realize that they have a fair chance of beating the target on every job they are assigned. Some of the lift crews are now beating their assigned targets consistently and are regularly earning substantial bonuses.

Climb crews are still performing at the same levels that they were at at the start of the new program. There are two main problems affecting the performance of the climb crews. First, union work rules still require groundman on all climb crews, whereas the standards provide for the use of all trimmers. The second problem is that many of the crew foremen are older men who are reluctant or have a difficult time performing all of the physical work called for in the labor standards.

LILCO is continuing work on upgrading its productivity improvement program. Additional work is required to improve and reinforce the labor standards for tree trimming and the estimating methods. Additionally, the Company is continually working with its contractors to improve crew performance.

If tree trimming is to remain competitive with other maintenance programs that improve service reliability to electric customers, crew performance must be improved. Hopefully LILCO's new performance system will allow the Company to continue to improve the cost effectiveness of its tree trimming program.

*Long Island Light Company  
 Hicksville, New York*