

ESTIMATING AND PRICING TREE CARE JOBS¹

by Richard E. Abbott & Kenneth C. Miller

Abstract. Tree care, pruning and removal operations have been difficult to price because each tree, each location, and each situation is different. Traditionally, tree care sales people have learned to estimate jobs by the trial and error method. Many times, the sales person has not been in sales over a long enough period of time to gain pricing experience. The concept of pricing using fixed and variable factors for the different tasks can accommodate the differences in trees, locations, and situations. The system can, and should be modified to each company's operations. The use of man-hours required to perform specific tree care operations provides the key to calculating costs and also provides a measurable basis to evaluate crew performance.

Résumé. Les coûts des opérations d'entretien, d'élagage et d'abattage d'arbres ont été difficiles à estimer parce que chaque localisation, chaque situation et chaque arbre est différent. Traditionnellement, les représentants des compagnies d'arboriculture ont appris à estimer le coût d'un travail en procédant par tâtonnements. Souvent, le représentant n'a pas été dans la vente pendant une période assez longue pour gagner une expérience dans l'estimation des coûts. Le concept d'estimer les coûts en utilisant les facteurs fixes et variables pour les différentes opérations peut s'adapter aux différents arbres, localisations et situations. Le système peut et devrait être modifié pour chaque opération de la compagnie. L'utilisation du nombre d'heures-homme requis pour réaliser une opération arboricole spécifique fournit la clé pour calculer les coûts et offre une base mesurable pour évaluer la performance des équipes.

The ability of a tree care company to survive and prosper depends on the capabilities and expertise of its sales personnel in correctly estimating the man-hours necessary for trimming and removal and *competitively* pricing jobs.

The man-hours required to perform a particular work function or task on a certain size tree under similar conditions will remain constant regardless of how much money is quoted to client. Many people in tree care sales will look at a tree and try to decide whether it is a \$150, \$160, or \$175 trimming job. Their price quote is based on a visual estimate of the necessary tree work. The difference in a low bid of \$150 and a high bid of \$175 frequently is the profit on the job. If dollar costs are used to develop the bid, these can only be an estimate and must be adjusted constantly for changing worker and equipment performance.

After completion of the job, it is impossible to evaluate actual crew performance without some

time schedule of how long it took to do the work. Therefore, required man-hours to perform the task (example: pruning, removal, etc.) is the preferred basis for estimating as well as evaluating crew performance on the different jobs. Man-hours are standard and can easily be converted into a price quote for the client by using current billing rates per man-hour and final price adjusted for competitiveness of the bid.

ACRT staff has used time and motion studies to develop work unit standards data. This information includes time requirements to perform various tree care and line clearance tasks with different size crews under various field conditions. The performance factors measured for the various tree care jobs include travel time, crew start up time, job set up time, tree size, trim time, special conditions, clean-up time, dump time, equipment breakdown, etc. This information has been collected on a large number of crews and varying size of trees to develop standard man-hour units for various tasks on different sizes of trees. ACRT routinely uses these average man-hour units to develop municipal and utility tree and vegetation management plans and to project work needs.

The various factors affecting man-hour determinations for the different tree care operations can be separated into those of a *fixed* and *variable* nature.

Fixed man-hour factors are those that will remain constant. For our purposes, we are going to define tree size for each different work task as fixed factors. For example, it requires 2.1 man-hours on the average for National Arborist Association (NAA) medium class II pruning of a 16" dbh tree. A 30" dbh tree requires 5.2 man-hours on the average for the same class of pruning. These average values should be constant for a specific size of tree and the pruning class.

Variable factors are those that modify the fixed factors for the special local situations. The bidder must then adjust the fixed man-hour work requirements for that particular tree. Examples of

1. Presented at the annual conference of the International Society of Arboriculture in San Antonio in August 1986

variable factors that will impact on the amount of time necessary to do the work are: presence of electric wires, proximity to building, heavy traffic situation, extensive decay in the tree, amount of deadwood, etc. Each of these variables will increase or decrease the standard fixed man-hours necessary to perform the work.

Before any price can be quoted for a job, the sales person should break the work to be performed into its simplest tasks, establish the fixed or variable man-hours to accomplish each of those tasks, and then combine these into the man-hours necessary to complete the job. Then multiply by your billing rate to establish a competitive bid for the job. Here is a representative, simple breakdown of the various tasks involved in pruning a tree:

| Task | Fixed factor | Variable factor |
|-------------------------------------------------------------------------------------------------------|--------------|-----------------|
| 1. Job assignment, pick up tools, gas up equipment | X | |
| 2. Travel time to job site | | X |
| 3. Work site organization, tools, traffic signs | X | |
| 4. Actual work operation climbing tree, cutting branches for a particular size tree and pruning class | X | |
| 5. Presence or absence of electric wires, traffic, buildings | | X |
| 6. Clean up of work site, chipping brush, cutting up wood for a particular pruning class or activity | X | |
| 7. Disposal of debris at dump site | | X |
| 8. Travel time back to crew headquarters | | X |

Before the average fixed-factor man-hours to prune or remove various size trees can be established, there must be simple, concise, understandable definitions of what is included in each of the tasks. When I say understandable, I mean the *property owner* must be able to interpret exactly what the differences are in the various pruning classes and the terminology. Our recommendation is to use the National Arborist Association *Pruning Standards for Shade Trees* as a basis for different degrees of pruning. That standard

has four classes: Class I: Fine Pruning, Class II: Medium Pruning, Class III: Coarse Pruning, and Class IV: Cutting Back or Dropcrotch Pruning. If these categories do not fit the types of services your company provides, modify them to fit your specific needs.

Following is a chart indicating representative average fixed and variable times to Class II (medium prune) various sizes of trees. Analyze the performance of your crews and adjust the average man-hours required for each size and pruning class to fit your circumstances. Base the figures on your average crew's performance on a normal day. Every crew has good and bad days, and all crews vary in productivity.

Table 1 illustrates the procedure in its simplest form for figuring an estimate for two men to prune two trees. For this example, 14.8 manhours are required to perform the two tasks of medium pruning a 16" oak and a 30" maple.

While this simplified example is very straightforward, the actual work is seldom that easy. Nearby buildings, wires, and tree decay all make the tasks more difficult. These are variable factors that must be included as modifiers of fixed factor man-hours to accommodate each local condition. Following is a list of some typical variable factors:

- A. Electric wires at outside edge of tree canopy: increase man-hours by 10 percent,
- B. Electric wires about half way between edge of canopy and tree trunk: increase man-hours by 20 percent,
- C. Electric wires near trunk of tree: increase man-hours by 40 percent,
- D. Tree within striking distance of building: increase man-hours by 10 percent,
- E. Tree within 25 feet of building: increase man-hours by 20 percent,
- F. Tree within 5 feet of building: increase man-hours by 40 percent,
- G. Traffic (medium volume) flagman necessary, part-time: increase man-hours by 25 percent,
- H. Traffic (heavy volume) flagman necessary, full time: increase man-hours by 50 percent,
- I. Brush and wood must be dragged from backyard to street for chipping: increase man-hours by 100 percent,
- J. Minor decay in tree trunk: no adjustment necessary,

- K. Major decay affecting 30 to 50 percent of trunk area: increase man-hours by 20 percent,
- L. Extensive decay affecting 60 to 90 percent of trunk area: increase man-hours by 50 percent,
- M. If the tree canopy is exceptionally sparse or thick: increase or decrease man-hours by 20 percent,
- N. Client desires firewood cut to length and left: increase man-hours by 20 percent and an additional 10 percent if must locate and stack.
- O. Deadwood in 20 percent or less of tree canopy: no adjustment necessary.
- P. Deadwood in 25 percent to 50 percent of tree canopy: increase man-hours by 25 percent.
- Q. Deadwood in more than 50 percent of tree canopy: increase man-hours by 60 percent.

Table 1. Example of man-hour estimating

| Task | Factor | Man hours | Crew members | Man hours |
|---------------------------------|--------|-----------|--------------|-----------|
| 1. Job assignment, etc. | Fixed | .5 | 2 | 1.0 |
| 2. Travel time, etc. | Var. | .75 | 2 | 1.5 |
| 3. Work site organization, etc. | Fixed | .25 | 2 | .5 |
| 4. Medium prune 16" oak | Fixed | 2.1 | 1 | 2.1 |
| 5. Medium Prune 30" maple | Fixed | 5.2 | 1 | 5.2 |
| 6. Clean Up | Fixed | .5 | 2 | 1.0 |
| 7. Disposal of debris | Var. | 1.0 | 2 | 2.0 |
| 8. Travel time, etc. | Var. | .75 | 2 | 1.5 |

Remember, all these are average man-hour limits and representative variable factor adjustments. They can be modified depending on the site evaluation of actual circumstances.

Here are the steps involved in estimating a job:

1. In the discussion with the property owner, determine exactly what they want done to trees. Define this work as accurately as possible using the NAA *Pruning Standards for Shade Trees* as a guide. We recommend giving the customer a copy of the Standard, marked to indicate which of the pruning class you are quoting. This ensures that the customer knows exactly what you planned to do. If the customer solicits competitive bids, the competition will be submitting a quote on supplying the same service.

2. Measure the trees, determine which variable factors apply, and develop an estimate of man-hours necessary to perform work. This man-hour

estimate can then be multiplied by your hourly billing rate to develop your quote to do the job. If you are in the middle of the busy season and have a lot of work ahead, it may not be desirable to undertake additional work that needs to be performed quickly. You may want to increase the price in the busy season. However, if you are in the slow season and you need work for the crews, you may want to consider reducing the price. Either way, whether you increase or decrease your bid, the man-hours necessary to do the work will remain constant. Additionally, you can evaluate your crew's actual time to perform the various tasks against the man-hours used to prepare your bid.

3. Have the customer sign the order. The order should include a description of the work to be done on each tree and a map showing the location of the tree. If it is not possible to get the customer's signature, send a letter confirming what you are going to do, the price for the work, and payment terms. You need some legal basis on which to perform the work; otherwise, the customer could decide not to pay you and it could be very difficult to collect your money.

4. Keep a record as to how long the crew took to do the work. Did they do everything in your estimate? Were there unusual weather factors, equipment breakdowns, or other complications? Did you underestimate or overestimate time? If you are off 30 minutes on the time necessary to do the work, you are eating into any profit, and if you miss by more than one hour, you need to re-evaluate your crew. Many companies have multiple crews varying in speed and job function. You, as the bidder, must be aware of these shortcomings and calculate projected time on average ability crews rather than top notch crews.

ACRT conducts Small Business Management training programs in Kent, Ohio, that are much more comprehensive on the actual bid procedures used to estimate tree trimming and removal. This overview introduces the concept of man-hours for different tree trimming, removal, and tree care tasks on various size of trees as the preferred method to develop estimates.

ACRT, Inc.
 152 E. Main St.
 Kent, Ohio 44240