EVALUATION OF TREES IN URBAN AREAS[1]

by James Kielbaso

Evaluation of shade trees is something most arborists have heard of and talked about. It sounds simple and straightforward in theory, but this often changes when we get into an actual case. There seem to be innumerable little things that come up to add to our confusion and help lead to a fuzzy situation with a lot of uncertainty.

I'm not sure that at the end of this discussion you'll know more, but I hope that you'll feel more comfortable the next time someone asks you to evaluate their tree. It seems that tree evaluation has changed considerably in recent years and is still changing.

A brief history of formulas may be of help in understanding where we are today. Armstrong (1947) reviewed various formulas and concluded that they were all arbitrary. First was the completely arbitrary method in Massachusetts of setting values from $5 to $150. The Roth method set a $15 price plus 5% per year compound interest. A circumference method multiplied the trunk circumference in inches by $5.00. A diameter method followed in which the truck diameter in inches was multiplied by $10-$20 on a sliding scale. Then followed a basal square-foot and a basal square-inch method, each subject to modifications for species and condition, etc. The square foot applied $75 and square inch applied 75 cents as the unit value. In 1929, Dr. E.P. Felt assigned one dollar per square inch basal area at dbh and then modified according to species, location, condition, and land value. These methods are progressively more refined and sophisticated from the arbitrary to the Felt. Various insights were added so that the Felt method is a distinct improvement over the simple basal area methods. The Felt method was slightly revised to become the Michigan Forestry and Park Association method. A major difficulty of these was that property value had to be used, and tree experts were challenged as not competent to assess property value.

The National Shade Tree Conference (now ISA) accepted a basic evaluation method in 1951, which was later published in booklet form in 1957, as *Shade Tree Evaluation.* The value of $5.00 per square-inch of basal area was adopted. This was revised to $6.00 in Revision I in 1965. Revision II had $9.00 in 1969. Revision III, 1975, became, *A Guide to the Professional Evaluation of Landscape Trees, Specimen Shrubs and Evergreens* and used $10 as the basic unit price. Whereas *Shade Tree Evaluation* considered only size, species and condition, the *Guide* also lists location as a factor for modifying the basic value to obtain the final estimate of value. The unit price has since moved to $12 and now is $15 per square inch. The question now is how to use the chart, or as it is now called, *Guide.*

As a basic consideration, evaluators must become good diagnosticians. Perhaps still one of the best diagnostic guides is that proposed by Welch (1941). It helps assure that nothing is missed.

First, the *size* of the tree must be determined since basic value is size-dependent. Measure the caliper (diameter) at 6 inches above the ground for trees 4-inches and less. Measure caliper at 12 inches for larger sizes up to 12 inches. For trees larger than 12 inches, this diameter is measured at 4½ feet above the ground, otherwise known to foresters as dbh. In any event, though, abnormalities such as root flare or trunk swelling should be adjusted for in order to provide realistic measures.

Once size is determined, there is a decision to be made. Trees from 1 inch-12 inches in caliper are considered replaceable and the cost for a replacement is used. The Michigan guide assumes that landscape trees up to six inches diameter are replaceable. If an exact replacement cannot be found locally, there is a table of average replacement costs published as Table II in the *Guide*. If the tree is larger than 12 inches it is not usually replaceable and the basic value is available

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from Table 1, page 13, which is derived by multiplying basal area (cross-sectional area) in inches by the current unit price, $15. It is my personal view that we should adjust our method of arriving at basic value so as to not require two separate charts in order to provide realistic values at small and large diameters. This situation stems from the fact that simply using the basal-area method through the whole size range resulted in too-low values for small trees up to about 12 inches. These problems were referred to by Kielbaso (1975).

Size is a very objective measure and should cause little problem other than where to measure or how to consider trees with multiple stems. An explanation of multi-stems is contained in the *Guide*, but "reasonable" is the key consideration.

The formula as currently used is:

Basic Value **or** *Replacement Cost* × *Species* × *Condition* × *Location* = *Value*

Having determined factor one, *species* is the next factor. Each of the factors is expressed as a percentage of what a perfect factor would be. In earlier revisions, extensive regional species classifications were included. The new *Guide* leaves this species category up to the expert or to a regional organization. In Michigan a comparable species rating is included with the Michigan Tree Evaluation Guide. Species are rated according to a number of factors, not the least of which is hardiness, or whether or not a tree will survive in the given climatic regime. Some other "species" considerations are insect or disease resistance, messiness, tendency to break up, etc. The species then has a rating of some percentage factor which may be further adjusted by the qualified appraiser based on experience and local conditions, etc.

Location is the next factor in the formula. I prefer to consider two aspects of location, *aesthetic* and *site.* "Aesthetic" location involves the appropriateness of the plant in the landscape, importance of the position in the landscape, presence of other trees (normally reduce the value when others are nearby, unless as an integral part, such as a row of trees), relation to the setting, etc. With location consider such situations as a large oak in front of an office, or in a corn field, or along a street: three entirely different locations. The *Guide* has a chart offering location-rating suggestions on page 6. Or contrast a blue spruce in a yard with one of similar size and form obstructing visibility at a street intersection. A building, beautiful in its own right, may be enhanced with trees. We often hear "the right tree in the right place," but with the location factor we might even consider "a wrong tree in the right place" or a "beautiful" boxelder, not highly rated as a species, viewed across a pond from a picture window. It certainly deserves a high location (aesthetic) rating.

The "site" aspect of location may be considered by some as "condition." Just so long as it is considered! I prefer to consider "site" from an ecologic point of view. Where is the tree growing and how well can it survive there? The difficulty of growing a pin oak or sugar maple on high pH soils is a location, or site problem. Trees growing in a three-foot treelawn which restricts roots are not in good locations. A tree in a paved parking lot certainly is growing in a poor location, or "site." A tree growing in close proximity to a buried steam pipe is at a decided site disadvantage of temperature and moisture. Many examples could be used, but be aware of these situations when estimating the value of a tree.

Condition is the last factor. Few trees are perfect. An evaluator has no obligation to place a dollar value on a worthless tree. Because a tree has green leaves is not adequate evidence for placing a positive value on it. As trees age they often become defective. The evaluator must judge how nearly the tree approaches a perfect specimen. Items to consider are overall vigor, size, form or crown shape, deadwood, decay, insect or disease problems, and expected life. The *Guide* has a chart offering condition-rating suggestions depending on estimated useful life on page 4. The information may not help in determining danger from heartrot, etc. A tree with deadwood or rot may live for 30 or more years but still be a hazard warranting down grading. Some have suggested that more specific guidelines be formulated for estimating condition classes

(McNabb, 1968; Kielbaso, 1975). These are not easy to develop, but to produce realistic, consistent estimates such guidelines would be quite valuable. A condition-rating guide should have several factors such as amount of deadwood, decay, growth rate, form, obstructions to growth and pests, with several categories for each and with brief descriptions for each. The evaluator could then produce estimates more in keeping with other evaluators.

An argument could be made regarding the desirability of such a "similar estimate." It is my belief that we can gain more acceptance by having different "experts" providing similar, but not identical, estimates. In evaluation workshops it was very informative to observe persons evaluating one tree and arriving at values ranging from $508 to $1272. Evaluation is not an exact science, but I'm not sure we gain anything by having such large differences when it comes to convincing others that we have a valid "scientific" method. Granted, the individual evaluators' expertise is of prime importance in this type of situation, but honest differences of such magnitude are likely to result in compromises, in which neither evaluators' expertise or judgment is fully accepted or utilized.

By constantly sharpening our observation skills, considering all factors and sincerely attempting to be reasonable and realistic, we should arrive at more consistent evaluations and at the same time fully demonstrate the competencies of individuals. The workshops that we have held in Michigan have proved worthwhile by allowing each of us to sharpen our skills by comparing judgments with our colleagues in a learning atmosphere. It can be quite satisfying to gain an insight or to help someone else to do so.

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ABSTRACT

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Despite the beauty of the landscape, high elevation, short growing seasons, and relatively low precipitation severely limit the potential for plant growth. The environmental limitations are magnified on the margins of freeways, where construction has left exposed slopes with little or no soil for moisture retention or seedbeds. A positive program was necessary if the damage from freeway construction was to be repaired. Trials were started in 1973 to see if native shrubs and hardy trees that appeared to be adapted to the site could establish themselves and survive on the high elevation roadsides. If these tests continue to show that seedlings can be quickly and cheaply planted in nearly barren rock and survive with almost no maintenance, the use of container-grown native shrubs for transplanting in eastern Sierra roadsides appears highly feasible. The costs, time, and facilities necessary for rearing native shrubs are quite substantial. The cost of establishing desirable shrubs on roadsides would be greatly reduced if direct-seeding techniques were developed.