

Working With the ISA BMP on Tree Risk Assessment

By Jerry Bond, Urban Forest Analytics LLC

Prelude

Plaintiff's Attorney: I have here the International Society of Arboriculture BMP on Tree Risk Assessment, and I see that it represents industry consensus.

Tree Consultant: That's correct.

PA: Can you explain to us what that means?

TC: Sure. The ISA convened some 70 experts from around the world to work out best management practices for the assessment of tree risk.

PA: Experts from around the whole world? 70 of them? That's very impressive! <looks meaningfully toward the jury> And they agreed that these were the best practices?

TC: Pretty much, yes.

PA: So did you follow their consensus in your investigation of the tree that subsequently fell on my client's garage?

TC: <pauses, coughs nervously>

Introduction

I propose here to take a look at the ISA's BMP on Tree Risk Assessment¹ from a twin perspective: 1) as one of the people involved in its development and 2) as a practitioner who has used it now for almost three years in large and small projects. I will argue that it has made significant contributions to the profession that should be considered carefully by

tree professionals, but that it simultaneously raises a number of issues that ought to be examined before the next edition is published.

It is important at the outset to recognize that putting together this BMP was very difficult, and all due credit should be given to the three authors for its successful completion. The combination of collaborating with a large number of researchers and practitioners and working with a large amount of complicated and often disputed material rendered the project both delicate and intense. It was of course impossible *a priori* to make everyone happy, but in my opinion, the profession should be very satisfied with a product that fulfills such a broad need.

Overview

The BMP is based on the ANSI A300 Standard for Tree Risk Assessment and, like almost all of the BMP guides, is intended as a "how to" to help practitioners implement the standard.² That Standard was itself based in part on ISO 31000, the international risk management standard.³ The BMP's focus on tree risk assessment and exclusion of tree risk management separates it somewhat from some other other international standards, but they share much in concepts, vocabulary and goals.

Various types of material make up the BMP, and I have found it easiest when talking about it to start by grouping its sections under functional types.

- **Core**

- » **Levels and Scope (Ch. 3):** Distinguishes three levels of tree risk assessment and describes specifications for a Scope of Work.

- » **Tree Risk Factors (Ch. 4):** Discusses the complicated factors affecting likelihood of a target being struck by a failure. Limited treatment of likelihood of failure.

- » **Tree Risk Categorization (Ch. 5):** Lays out the method for deriving a risk rating based on the use of two tables to link the likelihood of failure, the likelihood of impact, and severity of consequences.

- **Frame**

- » **Basics (Ch. 2):** Defines and restricts tree risk assessment and evaluation.

- » **Mitigation (Ch. 6):** Provides an overview of the required post-assessment decisions the arborist must reach.

- » **Reporting (Ch. 7):** Supplies guidelines for reporting the results of the assessment.

- **Appendices**

- » **Conflicts**

- » **Loads**

- » **Defects and Conditions**

- » **Response Growth**

- » **Advanced Assessment**

Most people I have talked to concur that the level of success varies greatly among these different functional groups, with some fulfilling BMP expectations much better than others.

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It is also important to understand at the outset that the BMP explicitly focuses on a single type of user (the arborist) and on a single form ("Basic") of tree risk assessment (Ch. 1). Furthermore, it becomes clear as the BMP proceeds that this arborist must have substantial time available per tree in order to follow the full method. Such an audience description is eminently suitable to most readers of this journal, perhaps, but less reliably so to tree risk assessors outside the consultant orbit, such as public tree managers, state and federal employees, and utility arborists.⁴

Successes

It seems likely to me that the BMP's most significant and lasting achievement will prove to be the third chapter on levels of risk management and scope of work, where three levels of assessment and level-appropriate techniques are described:

- **Level 1: Limited Visual**—"a visual assessment from a specified perspective of an individual tree or population of trees near specified targets, conducted in order to identify obvious defects of specified conditions" (p. 12)
- **Level 2: Basic**—"a detailed visual inspection of a tree and its surrounding site, and a synthesis of the information collected...may include the use of simple tools...is the standard assessment performed by arborists..." (p. 15)
- **Level 3: Advanced**—"a means] to provide detailed information about specific tree parts, defects, targets, or site conditions...specialized equipment, data collection and analysis, and/or expertise are usually required..." (p. 18).

What's so special about setting up these levels? First, the very fact that "tree risk assessment" is represented as a collection of distinct levels rather than a single coherent technique takes a strong posi-

tion. It also brings certain advantages. It protects arborists against being held actionable for not using a certain procedure during tree risk assessment that is not considered a standard part of the agreed level; it provides clients with a basis for quality control; and it obviates the need to make judgments about the standard use of more advanced tree risk assessment techniques.

The mechanism that makes these levels work in a legal context is the *Scope of Work*: the agreement between client and assessor on the "goals, limitations and budget" of the assessment. It is now possible for an arborist to state simply that "a Level 2 assessment will be conducted," citing the BMP, a procedure that is both easier and more secure for both parties. In my own practice I now routinely make such a declaration, requiring agreement from clients at least by email. Arborists



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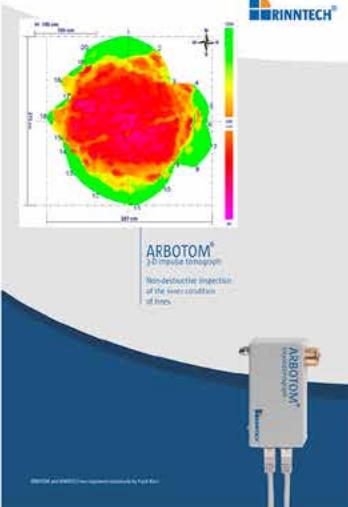
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with whom I have discussed the use of such a Scope all say they like this specification very much. Furthermore, though I am not a lawyer, it seems to me that a Scope of Work along the lines of the BMP could serve to provide crucial legal support via the mechanisms of contract law.

Moving to a top level, finally, the careful treatment of the central concept of *Risk* introduces a salutary change of perspective for tree risk evaluation. By providing arborists with a rationale for abandoning the simple use of defect recognition and measurement as the criterion for intervention, the BMP sets up an improved and more robust work framework. There remain many unknowns and unknowables in the estimation of probabilities and their interaction, and it is uncertain whether this approach will be equally useful for populations as for individual trees, but it surely points in the right direction.

Challenges

Not everything came out so well, however—as is unavoidable in such a complex undertaking. The BMP repeatedly includes information that, whatever its inherent interest, is finally unusable and/or not a best management practice as generally defined: “a method or technique that has consistently shown results superior to those achieved with other means.”⁵ Some examples will demonstrate the problem:

- Response growth: Arborists are left high and dry after reading the two sentences at the end of the discussion of this topic in Appendix 4: “Tree risk assessors should look for and assess the significance of response growth when evaluating the likelihood of failure... Currently, there are few guidelines for evaluating the effectiveness of response growth in compensation for structural weaknesses.” A more useful conclusion might have been that the absence/presence of response growth correlates with

the tree’s health and can be consulted as a primary index of the tree’s capacity to match increased stress with increased strength.

- Sudden branch drop: Introduced in Appendix 2 as a defect/condition that affects likelihood of failure, its description ends with this perplexing statement: “At the present time, it is not possible to predict failure or to mitigate risk due to SBD.” If SBD is not a defect/condition that can be predicted, then it has no place here. Perhaps more helpful for tree risk assessors would have been to clarify the distinction between “sudden branch drop” and a branch that drops suddenly, as I see the two frequently confused.
- Dynamic load tests: Brought in at the end of the advanced techniques Appendix 7, the short description ends with an admission of lack of usability: “Currently, this test is in the developmental stages, and the availability of sensors is limited.” It seems clear that a new test for which equipment, experience, and

professional review are lacking does not belong among the best management practices.

Because such material is superfluous and confusing, we need to identify it and either revise or remove it from the next edition.

A second challenge, from a practical point of view, is created by some of the side effects of using the risk matrix itself, whose apparent clarity and certainty can mask the high degree of uncertainty in the whole process. It may be easiest to see the difficulties that can arise if we look at the likelihood of failure and impact, since those factors often pose the most troublesome decisions during tree risk assessment (see Table 1).

A couple of observations are raised by the very construction of this matrix:

- Even the biggest tree with imminent failure likelihood will end up with a

Likelihood of Failure	Likelihood of Impacting Target			
	Very Low	Low	Medium	High
Imminent	Unlikely	Somewhat likely	Likely	Very likely
Probable	Unlikely	Unlikely	Somewhat likely	Likely
Possible	Unlikely	Unlikely	Unlikely	Somewhat likely
Improbable	Unlikely	Unlikely	Unlikely	Unlikely

Table 1. Matrix used to estimate the likelihood of a tree failure impacting a specified target (BMP, p. 34).

Likelihood of Failure	Definition
Imminent	Failure has started or is most likely to occur in the near future, even if there is no significant wind or increased load.
Probable	Failure may be expected under normal weather conditions within the specified time period
Plausible	Failure could occur under normal weather conditions within the specified time period
Possible	Failure could occur, but is unlikely under normal weather conditions within the specified time period
Improbable	The tree or branch is not likely to fail during normal weather conditions and may not fail in many severe weather conditions within the specified time period.

Table 2. Example of augmentation (green) of existing categories (BMP, p. 32) for likelihood of failure.



The BMP risk rating of this mature white oak (*Quercus alba*) will depend not so much on the defects visible in this photo, no matter how high their likelihood of failure, as on what we can't see: the potential targets below.

"low" risk rating in the BMP's Risk Table 2 if the likelihood of impacting the projected target is "unlikely." Yet this rating may not finally be useful for decision-makers who tend to be risk-averse with low probability-high consequence events.⁶

- Because of the limited scale, the likelihood of failure for most trees and tree parts examined by an arborist must be

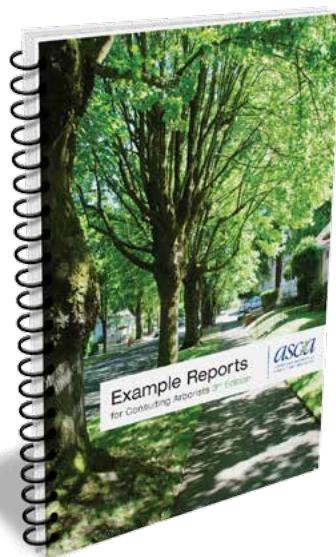
"possible" or "probable," given that the improbable will be passed over and the imminent are rare.

"Best" management should by definition include the recommended method of moving from a myriad of observed factors to a single reasonable decision. This reduction is complicated, contentious, and essential—every kind of tree

risk assessor could use some guidance at this juncture. The contrast between the first two appendices is instructive here: the first ("Conflicts") ends appropriately with a table of management strategies, while the second ("Loads") just comes to a stop. Some suggestion at the end of how exactly to take load into account in the field would aid many tree risk assessors.

The matrix compounds the problem. Despite the many complex defects, conditions, loads, species profiles, and health conditions that the BMP lays out for the arborist to consider, every judgment must eventually be assigned to one of two categories for most trees: possible or probable. The subtlety of an arborist's analysis therefore tends to be finally nullified in effect by this constraint. In my tree risk assessment work over the last three years, I have found that even the addition of a single category between "probable" and "possible" is a great help in the field. Table 2 shows how I have expanded it for my work.⁷

Because the BMP uses linked matrices, adding one category to any factor would require changes to the others. The easiest solution is to use 5x4 matrices instead of



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the current 4x4 ones,⁸ filling in the missing values by following the matrix pattern to ensure that the distinction being introduced by adding a category carries with it an actual difference in result.

Conclusions

There are three main points that I wanted to make with this brief review.

- Whether tree risk assessors happen to agree with the BMP or not, they do not have the option of ignoring it. It has been published with industry authority, and our work will be measured against it in the future. If we cannot demonstrate that our tree risk assessment procedures are commensurate with the BMP, we place ourselves in a potentially difficult situation.
- The BMP has achieved notable successes that we should consider carefully. The rigorous establishment of levels of assessment, the detailed discussion of Scope of Work, and the thorough treatment of the central concept of risk itself merit our attention and respect.
- The BMP will need revision, and con-

sultants practicing tree risk assessment have a unique role in that process. Observations and reflections about the application of the BMP methodology to everyday work will be of inestimable value to the authors of future editions.

Despite their brevity, I hope that my observations and comments here will serve to promote the important discussions that need to happen for the future success of the BMP on Tree Risk Assessment. 

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Notes

1. Smiley, E.T., Matheny, N., and S. Lilly. 2011. Best management practices: Tree risk assessment. Champaign, IL:ISA. iv + 81 pp.
2. ANSI . 2011. Tree, shrub, and other woody plant management standard practices. Tree risk assessment. a. Tree structure assessment. ANSI A300 (Part 9). Washington, D.C.:ANSI. 14 pp.
3. ISO 31000:2009, 2009. Risk management – Principles and guidelines. Geneva, Switzerland: International Standards Organisation. 24 pp.4. For a detailed examination of how the BMP might be adapted to utility arboriculture, see Bond, J., Sankovich, S., and C. J. Luley. 2014. Developing Risk Assessment Standards and Specifications for a Distribution System: A Case Study. Arborist News 23(4):56-62.
5. Wikipedia contributors. "Best practice." Wikipedia. Retrieved 22 July 2014 20:29 UTC.
6. Stewart, M., O'Callaghan, D., and M. Hartley. 2013. Quantified risk assessment: a critical review. The Bark. Arboriculture Australia 15(1):17-25.
7. The term and definition that I use illustrate one way to insert a middle category. If the concept of a middle category were ever accepted for future revisions of the BMP, much care would have to be taken concerning the exact language to be used since it would have legal implications.
8. See the relevant example by Norris, M. 2005. The elements of tree risk assessments. Paper for the Annual Conference of the International Society of Arboriculture, Australia Chapter, Launceston AU. In Hugh Taylor, 7-11-2005 Circular to Westpool – Metro Pool, p. 12. Online: www.unitedindependentspools.org/imagesDB/news/4_HughTaylorStudy07-11-05.pdf.

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