

**A300 (Part 9) Draft 1 Version 1 Tree Risk Assessment a. Tree Structure Assessment**

for Tree Care Operations –  
Tree, Shrub, and Other Woody Plant Management –  
Standard Practices (Tree Risk Assessment a. Tree Structure Assessment)

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**Foreword** (This foreword will not be considered part of the approved A300 Part 9 American National Standard)

ANSI A300 Standards are divided into multiple parts, each focusing on a specific aspect of woody plant management (e.g. Pruning, Soil Management, Supplemental Support Systems, etc).

These standards are used to develop written specifications for work assignments. They are not intended to be used as specifications in and of themselves. Management objectives may differ considerably and therefore must be specifically defined by the user. Specifications are then written to meet the established objectives and must include measurable criteria.

ANSI A300 standards apply to professionals who provide for, or supervise the management of, trees, shrubs, and other woody landscape plants. Intended users include businesses, government agencies, property owners, property managers, and utilities. The standard does not apply to agriculture, horticultural production, or silviculture, except where explicitly noted otherwise.

This standard has been developed by the Tree Care Industry Association (TCIA), an ANSI-accredited Standards Developing Organization (SDO). TCIA is secretariat of the ANSI A300 standards, and develops standards using procedures accredited by the American National Standards Institute (ANSI).

Consensus for standards writing was developed by the Accredited Standards Committee on Tree, Shrub, and Other Woody Plant Management Operations – Standard Practices, A300 (ASC A300).

Prior to 1991, various industry associations and practitioners developed their own standards and recommendations for tree care practices. Recognizing the need for a standardized, scientific approach, green industry associations, government agencies and tree care companies agreed to develop consensus for an official American National Standard.

The result – ANSI A300 standards – unify and take authoritative precedence over all previously existing tree care industry standards. ANSI requires that approved standards be developed according to accepted principles, and that they be reviewed and, if necessary, revised every five years.

TCIA was accredited as a standards developing organization with ASC A300 as the consensus body on June 28, 1991. ASC A300 meets regularly to write new, and review and revise existing, ANSI A300 standards. The committee includes industry representatives with broad knowledge and technical expertise from residential and commercial tree care, utility, municipal and federal sectors, landscape and nursery industries, and other interested organizations.

This draft is a public review document. The public review period starts on February 5, 2010, and ends on March 22, 2010. This document is not approved as a draft for trial use. Official public comments or information requests regarding this document must be forwarded to: [Rouse@tcia.org](mailto:Rouse@tcia.org), A300 Secretary, c/o Tree Care Industry Association, Inc., 136 Harvey Road - Suite 101, Londonderry, NH, 03053. Responses will be provided. Comments may be forwarded to ASC A300 members, however comments that are forwarded only to ASC A300 members may not be recorded as official comments and a response may not be provided.

The ASC A300 has the following members as of January 22, 2010:

Tim Johnson, Chair  
(Artistic Arborist, Inc.)

Bob Rouse, Secretary  
(Tree Care Industry Association, Inc.)

Organizations Represented	Name of Representative
Alliance for Community Trees	Michael Galvin
American Nursery and Landscape Association	Alice Ewan Walker (Alt.)
American Society of Consulting Arborists	Warren Quinn
American Society of Landscape Architects	Craig J. Regelbrugge (Alt.)
Asplundh Tree Expert Company	Jerry Pulley
Bartlett Tree Expert Company	Stephen Miller (Alt.)
Davey Tree Expert Company	Ron Leighton
International Society of Arboriculture	Geoff Kempter
National Park Service	Peter Fengler (Alt.)
Professional Grounds Management Society	Peter Becker
Professional Land Care Network	Dr. Thomas Smiley (Alt.)
Society of Municipal Arborists	Joseph Tommasi
Tree Care Industry Association	R.J. Laverne (Alt.)
USDA Forest Service	Bruce Hagen
Utility Arborist Association	Sharon Lilly (Alt.)
	Robert DeFeo
	Thomas Shaner
	Preston Leyshon
	Bill Brinn (Alt.)
	Gordon Mann
	Nolan Rundquist (Alt.)
	Dane Buell
	James McGuire (Alt.)
	Keith Cline
	Ed Macie (Alt.)
	Matthew Simons
	William Rees (Alt.)

Additional organizations and individuals:

American Forests (Observer)

Peter Gerstenberger (Observer)

Sabeena Hickman (Observer)

Andy Hillman (Observer)

Myron Laible (Observer)

Beth Palys (Observer)

Richard Rathjens (Observer)

Mary Reynolds (Observer)

Richard Roux (NFPA-780 Liaison)

Don Zimar (Observer)

ASC A300 mission statement:

Mission: To develop consensus performance standards based on current research and sound practice for writing specifications to manage trees, shrubs, and other woody plants.

## **Part 9 – Tree risk assessment a. tree structure assessment**

### ***Cause 1 excerpted from ANSI A300 (Part 1) Pruning.***

#### **1 Scope, purpose, and application**

##### **1.1 Scope**

ANSI A300 standards present performance standards for the care and management of trees, shrubs, and other woody plants.

##### **1.2 Purpose**

ANSI A300 standards are intended for use by federal, state, municipal, and private entities including arborists, property owners, property managers, and utilities for developing written specifications.

##### **1.3 Application**

ANSI A300 standards shall apply to any person or entity engaged in the management of trees, shrubs, or other woody plants.

## **90 Part 9 – Tree risk assessment standards**

### **90.1 Purpose**

The purpose of this clause is to provide guidelines for the practice of tree risk assessment and standards for writing specifications.

### **90.2 Reasons for tree risk assessment a. tree structure assessment**

To identify tree defects and other factors that affect the level of risk to a target and to provide information for mitigating risk. Exception: Tree risk assessment for emergency and post-emergency storm damage.

### **90.3 Implementation**

Specifications for tree risk evaluation and management should be written by an arborist familiar with qualitative and quantitative risk evaluation methods.

### **90.4 Safety**

**90.4.1** This performance standard shall not take precedence over applicable industry safe work practices.

**90.4.2** Performance shall comply with applicable Federal and State Occupational Safety

and Health Administration (OSHA) standards, ANSI Z133, Federal Insecticide, Fungicide, and Rodenticide Act (FIFRA), Federal Environmental Protection Agency (EPA) regulations as well as state and local regulations.

## **91 Normative references**

The following standards contain provisions which, through reference in this text, constitute provisions of this American National Standard. All standards are subject to revision, and parties to agreements based on this American National Standard shall apply the most recent edition of the standards indicated below.

ANSI Z133.1 *Arboricultural operations – Safety requirements*

29 CFR 1910, *General industry*<sup>1)</sup>

29 CFR 1910.268, *Telecommunications*<sup>1)</sup>

29 CFR 1910.269, *Electric power generation, transmission and distribution*<sup>1)</sup>

29 CFR 1910.331 - 335, *Electrical safety-related work practices*<sup>1)</sup>

**92 Definitions** (Definitions will not be considered part of the ANSI A300 Part 2 standard)

**92.1 aerial assessment:**

**92.2 arborist:** An individual engaged in the profession of arboriculture who, through experience, education and related training, possesses the competence to provide for, or supervise the management of, trees and other woody ornamentals.

**92.3 arborist trainee:** An individual undergoing on-the-job training to obtain the experience and the competence required to provide for, or supervise the management of, trees and woody ornamentals. Such trainees shall be under the direct supervision of an arborist.

**92.4 crown asymmetry:**

**92.5 live crown ratio:**

**92.6 mitigation:**

**92.7 pneumatic soil excavation:** The removal of soil using pressurized air to minimize root damage.

**92.8 qualitative risk analysis:**

**92.9 quantitative risk analysis:**

**92.10 shall:** As used in this standard, denotes a mandatory requirement.

**92.11 should:** As used in this standard, denotes an advisory recommendation.

**92.12 site history:**

**92.13 specifications:** A detailed, measurable plan or proposal for performing a work activity or providing a product, usually a written document.

**92.14 standard, ANSI A300:** The performance parameters established by industry consensus as a rule for the measure of extent, quality, quantity, value or weight used to write specifications.

**92.15 stability concern:**

**92.16 structural defect:**

**92.17 target:**

**92.18 tree risk assessment:**

**92.19 tree structure assessment:**

**92.20 visual tree assessment:** An inspection taken from a limited perspective.

**93 Tree structure assessment practices**

**93.1 Tree structure assessment objectives**

The objective shall be defined based on the intended use of the site and the assignment.

**93.2 General**

**93.2.1** Arborists assessing tree structure and failure potential shall have appropriate training and experience.

**93.3 Scope of work**

**93.3.1** The arborist should perform tree structure assessments on only those trees specifically identified in the scope of work.

**93.3.2** The scope of work specification should include, but not be limited to:

- 1) Specific trees to assess (i.e. location or selection criteria);
- 2) Level and details of risk assessment;
- 3) Type of report (e.g. oral, written) to be developed;
- 4) The timeframe for reporting; and,
- 5) To whom the report should be presented.

**93.3.3** The arborist shall not be required to perform a higher level of assessment than specified by the scope of work.

#### **93.4 Levels of risk assessment**

**93.4.1** The level and detail of tree risk assessment shall be specified.

**93.4.2** If defects that cannot be adequately assessed are detected during survey or basic inspection, an advanced assessment should be recommended.

**93.4.3** One or more of the following inspection levels shall be specified:

##### **93.4.3.1 Level 1 risk assessment – survey**

**93.4.3.1.1** Level 1 shall be a limited visual assessment of an individual tree or a population of trees to identify specified conditions or defects.

**93.4.3.1.2** Conditions to be identified should include obvious defects.

**93.4.3.1.3** Level 1 assessment shall be from a limited, specified perspective, such as drive-by, walk-by, aerial patrol.

**93.4.3.1.4** A Level 1 – survey assessment methodology shall be specified.

**93.4.3.1.5** Periodic assessments, monitoring, and follow-up recommendations should be made based on the outcome of the assessment and the objectives.

##### **93.4.3.2 Level 2 risk assessment – basic**

**93.4.3.2.1** Level 2 assessments shall include a 360-degree, ground-based visual inspection of the tree crown, trunk, above-ground roots, and site conditions around the tree.

**93.4.3.2.2** Use of hand tools, trowels, binoculars, or probes, shall not be precluded from a Level 2 assessment.

**93.4.3.2.3** A mallet or other tool should be used to sound the trunk, root collar and above ground buttress roots in order to detect large hollows and loose bark.

**93.4.3.2.4** Level 2 shall provide a detailed visual inspection of a tree(s) to detect the conditions specified and tree defects in relation to surrounding targets.

**93.4.3.2.5** A basic assessment should include the identification of conditions indicating the presence of structural defects including, but not limited to:

- Dead, diseased, broken branches, stems, and roots;
- Weakly attached branches and codominant stems;
- Mechanical damage and cracks into the wood;
- Abnormal growth such as swelling, ribs, flat areas, or seams;
- Indications of decay and cankers;
- Root plate lifting, abnormal trunk flare, lack of trunk flare, soil cracks, grade change, restricted or undermined roots;
- Unusual tree architecture including lean, low live crown ratio, poor taper, and crown asymmetry.

**93.4.3.2.6** Level 2 inspections should be considered annually; more frequently if species, tree size, tree condition or other factors indicate a need for a more frequent interval. Scheduling inspections shall be the responsibility of the tree owner.

**93.4.3.2.7** Monitoring and follow-up recommendations should be made based on the outcome of the assessment and the objectives.

### **93.4.3.3 Level 3 risk assessment – advanced**

**93.4.3.3.1** Level 3 assessments shall include all Level 2 requirements.

**93.4.3.3.2** Level 3 shall include advanced method(s) to provide more detailed information on tree structural strength, the extent of specific structural defects, conditions, or other factors in relation to a target.

**93.4.3.3.3** Level 3 assessment shall include, but is not limited to, one or more of the following tree assessment techniques:

- Aerial assessment of branch or stem defects;
- Drilling;
- Evaluation of target risk;
- Increment boring;
- Investigation of tree or site history related to possible or defined defects;
- Lean assessment;
- Probing;
- Pull testing;
- Radiation assessment (eg. radar, x-ray, gamma ray);
- Resistance drilling;
- Sonic assessment;
- Sounding; and,
- Sub-surface root and/or soil assessment.

**93.4.3.3.4** Tools and work practices that damage the tree beyond the scope of normal work practices shall be avoided.

### **93.5 Target identification**

The arborist should consult with the client to evaluate known and foreseeable targets (static target, dynamic target or moveable target) within likely striking distance of the specified tree(s) or tree parts.

### **93.6 Risk analysis and reporting**

**93.6.1** The analysis of the assessment data should include the following:

- Specified objectives;
- Tree species;
- Tree health;
- Site conditions and characteristics;
- History;
- Past failure patterns;
- Local weather patterns; and,
- Risk mitigation.

**93.6.2** The type of report (oral, written) required should be specified in the scope of work.

**93.6.2.1** Written reports should include:

- Identification and location of the specified tree(s);
- A description of the methods used;
- Tree risk evaluation;
- Recommendations for mitigating risk; and,
- Recommendations for monitoring and follow-up.

**93.6.2.1.1** All recommendations other than removal of the tree should contain an advisory that all potential structure and stability concerns associated with any tree cannot be eliminated.

**93.6.3** Monitoring and follow-up recommendations should be made based on the objective and the outcome of the mitigation steps.

### **93.6.4 Owner determination**

**93.6.4.1** It shall be the responsibility of the owner, the owner's agent, or the controlling authority to determine actions and implement follow-up recommendations, mitigation steps, and future inspections.

**Annex A – Risk assessment flow chart** (This annex will not be considered part of the ANSI A300 Part 2 standard.)

**Annex B – Tree structure assessment checklist** (This annex will not be considered part of the ANSI A300 Part 2 standard.)

- B-1** Visual tree assessments may include, but are not limited to:
- 1) Dead parts
  - 2) Weakly attached branches
    - Branch aspect ratio
    - Included bark
    - Multiple branches at one point
    - Epicormic branches and shoots
  - 3) Codominant stems
    - Included bark
  - 4) Cracks into or through the wood; ribs, seams
  - 5) Wood decay
    - Potential Indicators of Decay
    - Abnormal growth patterns
    - Positive Indicators of Decay
    - Cavities and other openings
    - Fungal fruiting structures
    - Carpenter ants
  - 6) Cankers
  - 7) Tree architecture
    - Live crown ratio
    - Height to diameter ratio
    - Lean
    - Branch distribution
    - Crown position – dominant, codominant, intermediate, suppressed
  - 8) Root and Root collar
    - Severed
    - Decay
    - Restrictions to growth
    - Girdling
    - Root plate lifting, soil cracks
    - Undermined
    - Broken
    - Basal flare
- B-2** Decay assessments may include, but are not limited to:
- 1) Sounding for bark separation and wood hollows
    - Mallets
  - 2) Probing for decay
    - Increment borer
    - Small diameter drill bits
    - Resistance recording drill
  - 3) Sonic measurements

- Two point sonic devices
- Multipoint sonic devices - *Picus* tomography
- 4) Other methods under development
  - Radar, tree and soil applications
  - Thermograph
  - X-ray, gamma ray
- 5) Root collar and root inspection
- 6) Aerial inspection
- 7) Pull testing
- 8) Modeling wind pattern and force – Wind Rose
- 9) Interpreting results of advanced assessment
  - Weather extremes – wind, snow, and ice levels that trees can withstand
  - Stem and branch strength loss/decay formula
  - Asymmetric decay
  - Guideline for action
  - Root loss assessment