

**American National Standard**

ANSI A300 (Part 1)-2001 Pruning  
Revision of ANSI A300-1995

*for Tree Care Operations —  
Tree, Shrub, and Other Woody Plant  
Maintenance —  
Standard Practices (Pruning)*

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ANSI®  
A300 (Part 1)-2001  
Revision of  
ANSI A300-1995

American National Standard  
for Tree Care Operations –

Tree, Shrub, and Other Woody Plant Maintenance –  
Standard Practices (*Pruning*)

Secretariat

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Approved May 22, 2001

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## American National Standard for Tree Care Operations –

# Tree, Shrub, and Other Woody Plant Maintenance – Standard Practices (Pruning)

## 1 ANSI A300 standards

### 1.1 Scope

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

### 1.2 Purpose

ANSI A300 standards are intended as guides for federal, state, municipal and private authorities including property owners, property managers, and utilities in the drafting of their maintenance specifications.

### 1.3 Application

ANSI A300 standards shall apply to any person or entity engaged in the business, trade, or performance of repairing, maintaining, or preserving trees, shrubs, or other woody plants.

### 1.4 Implementation

Specifications for tree maintenance should be written and administered by an arborist.

## 2 Part 1 – Pruning standards

### 2.1 Purpose

The purpose of this document is to provide standards for developing specifications for tree pruning.

### 2.2 Reasons for pruning

The reasons for tree pruning may include, but are not limited to, reducing risk, maintaining or improving tree health and structure, improving aesthetics, or satisfying a specific need. Pruning practices for agricultural, horticultural production, or silvicultural purposes are exempt from this standard.

### 2.3 Safety

**2.3.1** Tree maintenance shall be performed only by arborists or arborist trainees who, through related training or on-the-job experience, or both, are familiar with the practices and hazards of arboriculture and the equipment used in such operations.

**2.3.2** This standard shall not take precedence over arboricultural safe work practices.

**2.3.3** Operations shall comply with applicable Occupational Safety and Health Administration (OSHA) standards, ANSI Z133.1, as well as state and local regulations.

## 3 Normative references

The following standards contain provisions, which, through reference in the 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 Z60.1, *Nursery stock*

ANSI Z133.1, *Tree care operations - Pruning, trimming, repairing, maintaining, and removing trees, and cutting brush - 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>

## 4 Definitions

**4.1 anvil-type pruning tool:** A pruning tool that

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has a sharp straight blade that cuts against a flat metal cutting surface, in contrast to a *hook-and-blade-type pruning tool* (4.21).

**4.2 apical dominance:** Inhibition of growth of lateral buds by the terminal bud.

**4.3 arboriculture:** The art, science, technology, and business of commercial, public, and utility tree care.

**4.4 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 plants.

**4.5 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 other woody plants. Such trainees shall be under the direct supervision of an arborist.

**4.6 branch bark ridge:** The raised area of bark in the branch crotch that marks where the branch and parent meet.

**4.7 branch collar:** The swollen area at the base of a branch.

**4.8 callus:** Undifferentiated tissue formed by the cambium around a wound.

**4.9 cambium:** The dividing layer of cells that forms sapwood (xylem) to the inside and inner bark (phloem) to the outside.

**4.10 cleaning:** Selective pruning to remove one or more of the following parts: dead, diseased, and/or broken branches (5.6.1).

**4.11 climbing spurs:** Sharp, pointed devices affixed to a climber's boot used to assist in climbing trees. (syn.: gaffs, hooks, spurs, spikes, climbers)

**4.12 closure:** The process of woundwood covering a cut or other tree injury.

**4.13 crown:** The leaves and branches of a tree measured from the lowest branch on the trunk to the top of the tree.

**4.14 decay:** The degradation of woody tissue

caused by microorganisms.

**4.15 espalier:** The combination of pruning, supporting, and training branches to orient a plant in one plane (5.7.2).

**4.16 establishment:** The point after planting when a tree's root system has grown sufficiently into the surrounding soil to support shoot growth and anchor the tree.

**4.17 facility:** A structure or equipment used to deliver or provide protection for the delivery of an essential service, such as electricity or communications.

**4.18 final cut:** A cut that completes the removal or reduction of a branch or stub.

**4.19 frond:** A leaf of a palm.

**4.20 heading:** 1. Cutting a currently growing, or a 1-year-old shoot, back to a bud. 2. Cutting an older branch or stem back to a stub in order to meet a defined structural objective. 3. Cutting an older branch or stem back to a lateral branch not large enough to assume apical dominance in order to meet a defined structural objective. Heading may or may not be an acceptable pruning practice, depending on the application.

**4.21 hook-and-blade-type pruning tool:** A pruning tool that has a sharp curved blade that overlaps a supporting hook; in contrast to an *anvil-type pruning tool* (4.1). (syn.: by-pass pruner)

**4.22 interfering branches:** Crossing, rubbing, or upright branches that have the potential to damage tree structure and/or health.

**4.23 internodal cut:** A cut located between lateral branches or buds.

**4.24 lateral branch:** A shoot or stem growing from a parent branch or stem.

**4.25 leader:** A dominant or co-dominant, upright stem.

**4.26 limb:** A large, prominent branch.

**4.27 lion's tailing:** The removal of an excessive number of inner, lateral branches from parent

branches. Lion's tailing is not an acceptable pruning practice (5.5.7).

**4.28 mechanical pruning:** A utility pruning technique where large-scale power equipment is used to cut back branches (5.9.2.2).

**4.29 parent branch or stem:** A tree trunk, limb, or prominent branch from which shoots or stems grow.

**4.30 peeling:** *For palms:* The removal of only the dead frond bases at the point they make contact with the trunk without damaging living trunk tissue. (syn.: shaving)

**4.31 petiole:** A stalk of a leaf or frond.

**4.32 phloem:** Inner bark conducting tissues that transport organic substances, primarily carbohydrates, from leaves and stems to other parts of the plant.

**4.33 pollarding:** The maintenance of a tree by making internodal cuts to reduce the size of a young tree, followed by the annual removal of shoot growth at its point of origin (5.7.3).

**4.34 pruning:** The selective removal of plant parts to meet specific goals and objectives.

**4.35 qualified line-clearance arborist:** An individual who, through related training and on-the-job experience, is familiar with the equipment and hazards in line clearance and has demonstrated the ability to perform the special techniques involved. This individual may or may not be currently employed by a line-clearance contractor.

**4.36 qualified line-clearance arborist trainee:** An individual undergoing line-clearance training and who, in the course of such training, is familiar with the hazards and equipment involved in line clearance and has demonstrated ability in the performance of the special techniques involved. This individual shall be under the direct supervision of a qualified line-clearance arborist.

**4.37 raising:** Selective pruning to provide vertical clearance (5.6.3).

**4.38 reduction:** Selective pruning to decrease height and/or spread (5.6.4).

**4.39 remote/rural areas:** Locations associated

with very little human activity, land improvement, or development.

**4.40 restoration:** Selective pruning to improve the structure, form, and appearance of trees that have been severely headed, vandalized, or damaged (5.7.4).

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

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

**4.43 stub:** An undesirable short length of a branch remaining after a break or incorrect pruning cut is made.

**4.44 thinning:** Selective pruning to reduce density of live branches (5.6.2).

**4.45 throwline:** A small, lightweight line with a weighted end used to position a climber's rope in a tree.

**4.46 topping:** The reduction of a tree's size using heading cuts that shorten limbs or branches back to a predetermined crown limit. Topping is not an acceptable pruning practice (5.5.7).

**4.47 tracing:** The removal of loose, damaged tissue from in and around the wound.

**4.48 urban/residential areas:** Locations, such as populated areas including public and private property, that are normally associated with human activity.

**4.49 utility:** An entity that delivers a public service, such as electricity or communications.

**4.50 utility space:** The physical area occupied by a utility's facilities and the additional space required to ensure its operation.

**4.51 vista pruning:** Selective pruning to allow a specific view (5.7.5).

**4.52 watersprouts:** New stems originating from epicormic buds. (syn.: epicormic shoots)

**4.53 wound:** An opening that is created when the bark of a live branch or stem is penetrated, cut, or removed.

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**4.54 woundwood:** Partially differentiated tissue responsible for closing wounds. Woundwood develops from callus associated with wounds.

**4.55 xylem:** Wood tissue. Active xylem is sapwood; inactive xylem is heartwood.

**4.56 young tree:** A tree young in age or a newly transplanted tree.

## 5 Pruning practices

### 5.1 Tree inspection

**5.1.1** An arborist or arborist trainee shall visually inspect each tree before beginning work.

**5.1.2** If a condition is observed requiring attention beyond the original scope of the work, the condition should be reported to an immediate supervisor, the owner, or the person responsible for authorizing the work.

### 5.2 Tools and equipment

**5.2.1** Equipment and work practices that damage living tissue and bark beyond the scope of the work should be avoided.

**5.2.2** Climbing spurs shall not be used when climbing and pruning trees.

Exceptions:

- when limbs are more than throwline distance apart and there is no other means of climbing the tree;
- when the bark is thick enough to prevent damage to the cambium;
- in remote or rural utility rights-of-way.

### 5.3 Pruning cuts

**5.3.1** Pruning tools used in making pruning cuts shall be sharp.

**5.3.2** A pruning cut that removes a branch at its point of origin shall be made close to the trunk or parent limb, without cutting into the branch bark ridge or collar, or leaving a stub (see Figure 5.3.2).

**5.3.3** A pruning cut that reduces the length of a branch or parent stem should bisect the angle between its branch bark ridge and an imaginary line perpendicular to the branch or stem (see Figure 5.3.3).

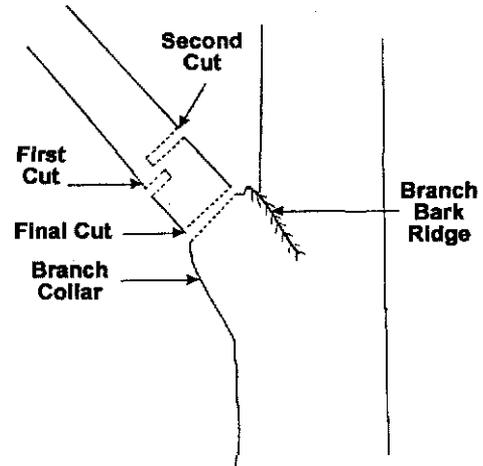
**5.3.4** The final cut shall result in a flat surface with adjacent bark firmly attached.

**5.3.5** When removing a dead branch, the final cut shall be made just outside the collar of living tissue.

**5.3.6** Tree branches shall be removed in such a manner so as not to cause damage to other parts of the tree or to other plants or property. Branches too large to support with one hand shall be precut to avoid splitting of the wood or tearing of the bark (see Figure 5.3.2). Where necessary, ropes or other equipment shall be used to lower large branches or portions of branches to the ground.

**5.3.7** A final cut that removes a branch with a narrow angle of attachment should be made from the outside of the branch to prevent damage to the parent limb (see Figure 5.3.7).

**5.3.8** Severed limbs shall be removed from the crown upon completion of the pruning, at times when the tree would be left unattended, or at the end of the workday.



**Figure 5.3.2.** – A pruning cut that removes a branch at its point of origin shall be made close to the trunk or parent limb, without cutting into the branch bark ridge or collar, or leaving a stub. Branches too large to support with one hand shall be precut to avoid splitting of the wood or tearing of the bark.

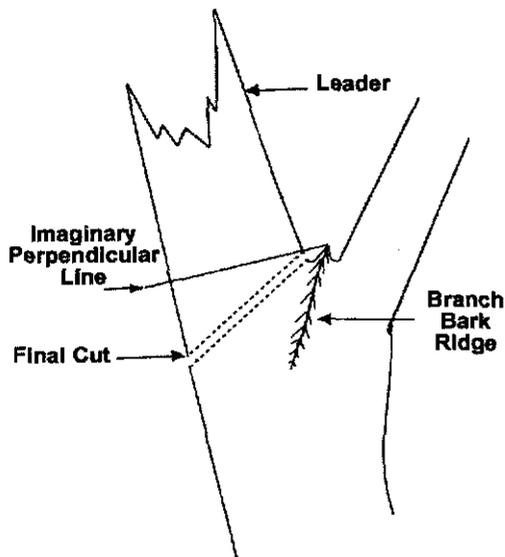


Figure 5.3.3. – A pruning cut that reduces the length of a branch or parent stem should bisect the angle between its branch bark ridge and an imaginary line perpendicular to the branch or stem.

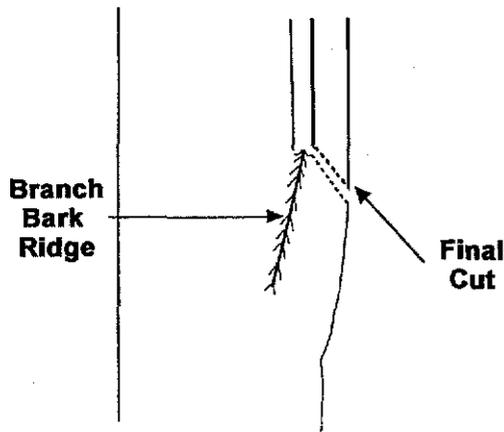


Figure 5.3.7. – A final cut that removes a branch with a narrow angle of attachment should be made from the outside of the branch to prevent damage to the parent limb.

## 5.4 Wound treatment

5.4.1 Wound treatments should not be used to cover wounds or pruning cuts, except when recommended for disease, insect, mistletoe, or sprout control, or for cosmetic reasons.

5.4.2 Wound treatments that are damaging to tree tissues shall not be used.

5.4.3 When tracing wounds, only loose, damaged tissue should be removed.

## 5.5 Pruning objectives

5.5.1 Pruning objectives shall be established prior to beginning any pruning operation.

5.5.2 To obtain the defined objective, the growth cycles and structure of individual species and the type of pruning to be performed should be considered.

5.5.3 Not more than 25 percent of the foliage should be removed within an annual growing season. The percentage and distribution of foliage to be removed shall be adjusted according to the plant's species, age, health, and site.

5.5.4 Not more than 25 percent of the foliage of a branch or limb should be removed when it is cut back to a lateral. That lateral should be large enough to assume apical dominance.

5.5.5 Pruning cuts should be made in accordance with 5.3 *Pruning cuts*.

5.5.6 Heading should be considered an acceptable practice for shrub or specialty pruning when needed to reach a defined objective.

5.5.7 Topping and lion's tailing shall be considered unacceptable pruning practices for trees.

## 5.6 Pruning types

Specifications for pruning should consist of, but are not limited to, one or more of the following types:

5.6.1 **Clean:** Cleaning shall consist of selective pruning to remove one or more of the following parts: dead, diseased, and/or broken branches.

5.6.1.1 Location of parts to be removed shall be specified.

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**5.6.1.2** Size range of parts to be removed shall be specified.

**5.6.2 Thin:** Thinning shall consist of selective pruning to reduce density of live branches.

**5.6.2.1** Thinning should result in an even distribution of branches on individual limbs and throughout the crown.

**5.6.2.2** Not more than 25 percent of the crown should be removed within an annual growing season.

**5.6.2.3** Location of parts to be removed shall be specified.

**5.6.2.4** Percentage of foliage and size range of parts to be removed shall be specified.

**5.6.3 Raise:** Raising shall consist of selective pruning to provide vertical clearance.

**5.6.3.1** Vertical clearance should be specified.

**5.6.3.2** Location and size range of parts to be removed should be specified.

**5.6.4 Reduce:** Reduction shall consist of selective pruning to decrease height and/or spread.

**5.6.4.1** Consideration shall be given to the ability of a species to tolerate this type of pruning.

**5.6.4.2** Location of parts to be removed and clearance should be specified.

**5.6.4.3** Size range of parts should be specified.

### 5.7 Specialty pruning

Consideration shall be given to the ability of a species to tolerate specialty pruning, using one or more pruning types (5.6).

#### 5.7.1 Young trees

**5.7.1.1** The reasons for young tree pruning may include, but are not limited to, reducing risk, maintaining or improving tree health and structure, improving aesthetics, or satisfying a specific need.

**5.7.1.2** Young trees that will not tolerate repetitive

pruning and have the potential to outgrow their space should be considered for relocation or removal.

#### 5.7.1.3 At planting

**5.7.1.3.1** Pruning should be limited to cleaning (5.6.1).

**5.7.1.3.2** Branches should be retained on the lower trunk.

#### 5.7.1.4 Once established

**5.7.1.4.1** Cleaning should be performed (5.6.1).

**5.7.1.4.2** Rubbing and poorly attached branches should be removed.

**5.7.1.4.3** A central leader or leader(s) as appropriate should be developed.

**5.7.1.4.4** A strong, properly spaced scaffold branch structure should be selected and maintained.

**5.7.1.4.5** Interfering branches should be reduced or removed.

#### 5.7.2 Espalier

**5.7.2.1** Branches that extend outside the desired plane of growth shall be pruned or tied back.

**5.7.2.2** Ties should be replaced as needed to prevent girdling the branches at the attachment site.

#### 5.7.3 Pollarding

**5.7.3.1** Consideration shall be given to the ability of the individual tree to respond to pollarding.

**5.7.3.2** Management plans shall be made prior to the start of the pollarding process for routine removal of watersprouts.

**5.7.3.3** Internodal cuts shall be made at specific locations to start the pollarding process. After the initial cuts are made, no additional internodal cut shall be made.

**5.7.3.4** Watersprouts growing from the cut ends of branches (knuckles) should be removed annually during the dormant season.

## 5.7.4 Restoration

5.7.4.1 Restoration shall consist of selective pruning to improve the structure, form, and appearance of trees that have been severely headed, vandalized, or damaged.

5.7.4.2 Location in tree, size range of parts, and percentage of watersprouts to be removed should be specified.

## 5.7.5 Vista pruning

5.7.5.1 Vista pruning shall consist of selective pruning to allow a specific view.

5.7.5.2 Size range of parts, location in tree, and percentage of foliage to be removed should be specified.

## 5.8 Palm pruning

5.8.1 Palm pruning should be performed when fronds, fruit, or loose petioles may create a dangerous condition.

5.8.2 Live healthy fronds, initiating at an angle of 45 degrees or greater from horizontal, with frond tips at or below horizontal, should not be removed.

5.8.3 Fronds removed should be severed close to the petiole base without damaging living trunk tissue.

5.8.4 Palm peeling (shaving) should consist of the removal of only the dead frond bases at the point they make contact with the trunk without damaging living trunk tissue.

## 5.9 Utility pruning

### 5.9.1 General

5.9.1.1 The purpose of utility pruning is to prevent the loss of service, comply with mandated clearance laws, prevent damage to equipment, avoid access impairment, and uphold the intended usage of the facility/utility space.

5.9.1.2 Only a qualified line clearance arborist or line clearance arborist trainee shall be assigned to line clearance work in accordance with ANSI Z133.1, 29 CFR 1910.331 – 335, 29 CFR 1910.268 or 29 CFR 1910.269.

5.9.1.3 Utility pruning operations are exempt from requirements in 5.1 Tree Inspection:

5.1.1 *An arborist or arborist trainee shall visually inspect each tree before beginning work.*

5.1.2 *If a condition is observed requiring attention beyond the original scope of the work, the condition should be reported to an immediate supervisor, the owner, or the person responsible for authorizing the work.*

5.9.1.4 Safety inspections of the work area are required as outlined in ANSI Z133.1 4.1.3, *job briefing*.

## 5.9.2 Utility crown reduction pruning

### 5.9.2.1 Urban/residential environment

5.9.2.1.1 Pruning cuts should be made in accordance with 5.3, Pruning cuts. The following requirements and recommendations of 5.9.2.1.1 are repeated from 5.3 Pruning cuts.

5.9.2.1.1.1 A pruning cut that removes a branch at its point of origin shall be made close to the trunk or parent limb, without cutting into the branch bark ridge or collar, or leaving a stub (see Figure 5.3.2).

5.9.2.1.1.2 A pruning cut that reduces the length of a branch or parent stem should bisect the angle between its branch bark ridge and an imaginary line perpendicular to the branch or stem (see Figure 5.3.3).

5.9.2.1.1.3 The final cut shall result in a flat surface with adjacent bark firmly attached.

5.9.2.1.1.4 When removing a dead branch, the final cut shall be made just outside the collar of living tissue.

5.9.2.1.1.5 Tree branches shall be removed in such a manner so as not to cause damage to other parts of the tree or to other plants or property. Branches too large to support with one hand shall be precut to avoid splitting of the wood or tearing of the bark (see Figure 5.3.2). Where necessary, ropes or other equipment shall be used to lower large branches or portions of branches to the ground.

5.9.2.1.1.6 A final cut that removes a branch

## **ANSI A300 (Part 1)-2001 Pruning**

with a narrow angle of attachment should be made from the bottom of the branch to prevent damage to the parent limb (see Figure 5.3.7).

**5.9.2.1.2** A minimum number of pruning cuts should be made to accomplish the purpose of facility/utility pruning. The natural structure of the tree should be considered.

**5.9.2.1.3** Trees directly under and growing into facility/utility spaces should be removed or pruned. Such pruning should be done by removing entire branches or by removing branches that have laterals growing into (or once pruned, will grow into) the facility/utility space.

**5.9.2.1.4** Trees growing next to, and into or toward facility/utility spaces should be pruned by reducing branches to laterals (5.3.3) to direct growth away from the utility space or by removing entire branches. Branches that, when cut, will produce watersprouts that would grow into facilities and/or utility space should be removed.

**5.9.2.1.5** Branches should be cut to laterals or the parent branch and not at a pre-established clearing limit. If clearance limits are established, pruning cuts should be made at laterals or parent branches outside the specified clearance zone.

### **5.9.2.2 Rural/remote locations – mechanical pruning**

Cuts should be made close to the main stem, outside of the branch bark ridge and branch collar. Precautions should be taken to avoid stripping or tearing of bark or excessive wounding.

### **5.9.3 Emergency service restoration**

During a utility-declared emergency, service must be restored as quickly as possible in accordance with ANSI Z133.1, 29 CFR 1910.331 – 335, 29 CFR 1910.268, or 29 CFR 1910.269. At such times it may be necessary, because of safety and the urgency of service restoration, to deviate from the use of proper pruning techniques as defined in this standard. Following the emergency, corrective pruning should be done as necessary.

**Annex A**  
(informative)

**Reference publications**

International Society of Arboriculture (ISA). 1995. *Tree Pruning Guidelines*. Savoy, IL: International Society of Arboriculture (ISA).

the attachment of the branch to the trunk and can lead to branch failure when the tree matures. You should prune branches with weak attachments while they are young.

Avoid over-thinning the interior of the tree. The leaves of each branch must manufacture enough food to keep that branch alive and growing. In addition, each branch must contribute food to grow and feed the trunk and roots. Removal of too many leaves can "starve" the tree, reduce growth and make the tree unhealthy. A good rule of thumb is to maintain at least half the foliage on branches arising in the lower 2/3 of the tree.

### Newly planted trees

Pruning of newly planted trees should be limited to corrective pruning. Remove torn or broken branches. Save other pruning measures for the second or third year.

The belief that trees should be pruned when planted to compensate for root loss is misguided. Trees need their leaves and shoot tips to provide food and the substances which stimulate new root production. Unpruned trees establish faster, with a stronger root system than trees pruned at the time of planting.

### Wound dressings

Wound dressings were once thought to accelerate wound closure, protect against insects and diseases, and reduce decay. However, research has shown that dressings do not reduce decay or speed closure, and rarely prevent insect or disease infestations. Most experts recommend that wound dressing not be used. If a dressing must be used for cosmetic purposes, use a thin coating of a material that is not toxic to the plant.

### For Additional Information

More detailed information about pruning is available in *Tree-Pruning Guidelines*, prepared by the International Society of Arboriculture (ISA).

ISA offers several other brochures in this series that discuss many of the basic principles of tree care.

- Pruning Young Trees
- Why Topping Hurts Trees
- Mature Tree Care
- Recognizing Tree Hazards
- Insect and Disease Problems
- Plant Health Care
- Avoiding Tree and Utility Conflicts

- Benefits of Trees
- Tree Selection
- New Tree Planting
- Tree and Turf Relationships
- Buying High-Quality Trees
- Tree Values
- Why Hire an Arborist

This brochure is one in a series published by the International Society of Arboriculture as part of its Consumer Information Program. You may have additional interest in the following titles currently in the series: • Insect and Disease Problems • Mature Tree Care • New Tree Planting • Trees and Turf • Benefits of Trees • Tree Selection • Plant Health Care • Avoiding Tree and Utility Conflicts • Recognizing Tree Hazards • Why Hire an Arborist • Buying High-Quality Trees • Tree Values.



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# Pruning Young Trees



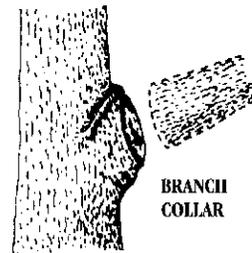
**P**roper pruning is essential in developing a tree with a strong structure and desirable form. Trees that receive the appropriate pruning measures while they are young will require little corrective pruning when they mature.

There are a few simple principles that everybody should understand before they set out to prune a tree.

- Each cut has the potential to change the growth of the tree. Always have a purpose in mind before a cut is made.
- Proper technique is essential. Poor pruning can cause damage that lasts for the life of the tree. Learn where and how to make the cuts before picking up the pruning shears.
- Trees do not "heal" the way people do. When a tree is wounded it must grow over and "compartmentalize" the wound. In effect the wound is contained within the tree forever.
- As a rule, small cuts do less damage to the tree than large cuts. This is why proper pruning (training) of young trees is critical. Waiting to prune a tree when it is mature can create the need for large cuts that the tree cannot easily close.

### Making the cut

Where you make a pruning cut is critical to a tree's response in growth and wound closure. Pruning cuts should be made just outside the branch collar. Since the branch collar contains trunk or parent branch tissues, the tree will be damaged unnecessarily if you remove or damage it. In fact, if the cut is large, the tree may suffer permanent internal decay from an improper pruning cut.

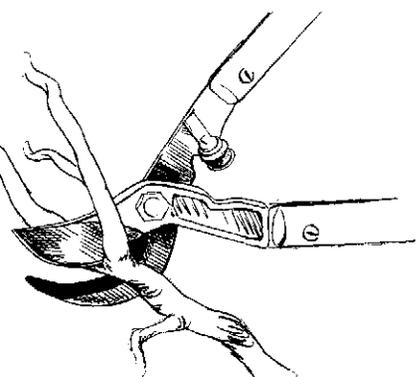


Pruning cuts should be made just outside the branch collar.

If a permanent branch is to be shortened, cut it back to a lateral branch or bud. Internodal cuts, or cuts made between buds or branches, may lead to stem decay, sprout production and misdirected growth.

## Pruning tools

When pruning trees, it is important to have the right tool for the job. For small trees, most of the cuts can be made with hand pruning



Cuts made along a branch should be made at a lateral branch or bud.



Bypass pruning shears.



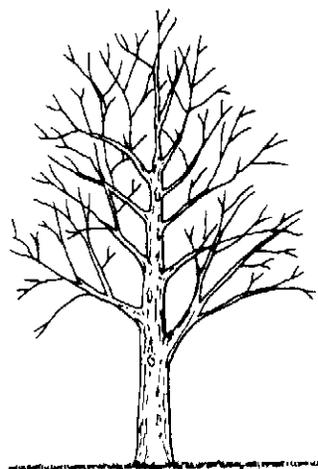
Never use hedge shears to prune your trees.

shears (scateurs). The scissor type, or by-pass blade hand pruners are preferred over the anvil type. They make cleaner, more accurate cuts. Cuts larger than 1/2 inch in diameter should be made with lopping shears or a pruning saw. Never use hedge shears to prune a tree. Whatever tool you use, make sure it is kept clean and sharp.

## Establishing a strong scaffold structure

A good structure of primary, scaffold branches should be established while the tree is young. The scaffold branches provide the framework of the mature tree. Properly trained young trees will develop a strong structure that will require less corrective pruning as they mature.

The goal in training young trees is to establish a strong trunk with sturdy, well-spaced branches. The strength of the branch structure depends on the relative sizes of the branches, the branch angles and the spacing of the limbs. Naturally, this will vary with the growth habit of the tree. Pin oaks and sweetgums, for example,



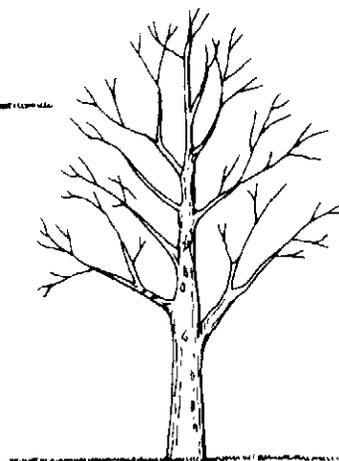
Select strong permanent scaffold branches that are spaced 12-18 inches apart.

have a conical shape with a central leader. Elms and live oaks are often wide-spreading without a central leader. Other trees, such as lindens and Bradford pears, are densely branched. Good pruning techniques remove structurally weak branches while maintaining the natural form of the tree.

## Trunk development

For most young trees, maintain a single, dominant leader. Do not prune back the tip of this leader. Do not allow secondary branches to outgrow the leader. Sometimes a tree will develop double leaders known as codominant stems. These can lead to structural weaknesses, so it is best to remove one while the tree is young.

The lateral branches contribute to the development of a sturdy, well-tapered trunk. It is important to leave some of these lateral branches in place, even though they may be pruned out later. These branches, known as temporary branches, also help protect the trunk from sun and mechanical

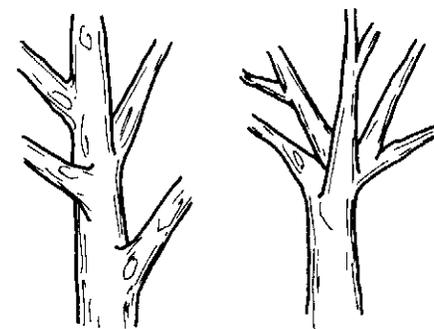


When codominant stems develop, bark may become "included" in the crotch. It is best to prune one of the stems while the tree is young.

injury. Temporary branches should be kept short enough not to be an obstruction or compete with selected permanent branches.

## Permanent branch selection

Nursery trees often have low branches that may make the tree appear well-proportioned when young, but low branches are seldom appropriate for large growing trees in an urban environment. How a young tree is trained depends on its primary function in the landscape. For example, street trees must be pruned so that they allow at least 16 feet of clearance for traffic. Most landscape trees only require about eight feet of clearance.



Branches should be well spaced radially and along the trunk as shown in the tree on the left.

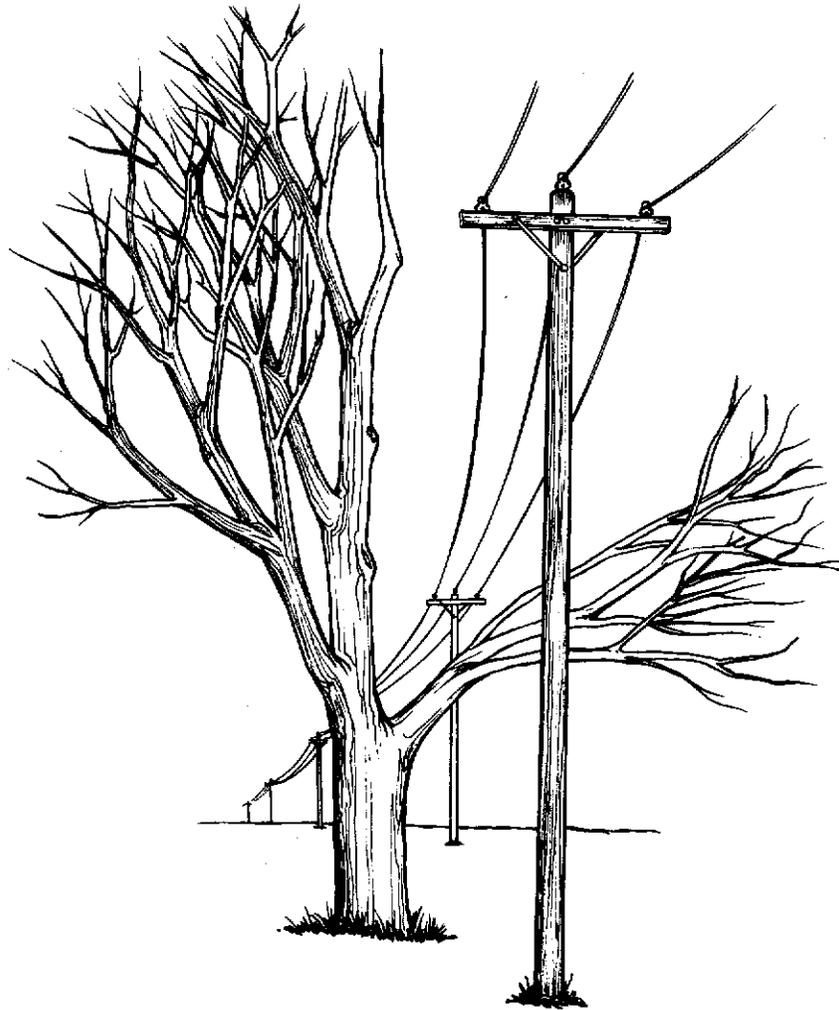
The height of the lowest permanent branch is determined by the tree's intended function and location in the landscape. Trees that are used to screen an unsightly view or provide a wind break may be allowed to branch low to the ground. Most large growing trees in the landscape must eventually be pruned to allow head clearance.

The spacing of branches, both vertically and radially in the tree is very important. Branches selected as permanent, scaffold branches must be well-spaced along the trunk. Maintain radial balance with branches growing outward in each direction.

A good rule of thumb for the vertical spacing of permanent branches is to maintain a distance equal to 3% of the tree's eventual height. Thus a tree that will be 50 feet tall should have permanent scaffold branches spaced about 18 inches apart along the trunk. Avoid allowing two scaffold branches to arise one above the other on the same side of the tree.

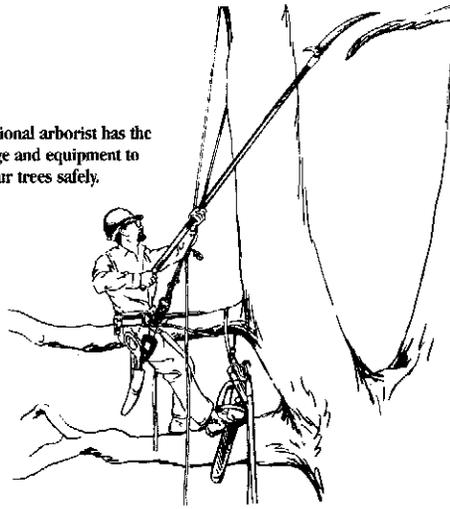
Some trees have a tendency to develop branches with narrow angles of attachment and tight crotches. As the tree grows, bark can become enclosed deep within the crotch between the branch and the trunk. This is called included bark. Included bark weakens

# UTILITY PRUNING OF TREES



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A professional arborist has the knowledge and equipment to prune your trees safely.



There are a variety of things to consider when selecting an arborist:

- Membership in professional organizations such as the International Society of Arboriculture (ISA), the National Arborist Association (NAA) or the American Society of Consulting Arborists (ASCA).
- Certification through the ISA Certified Arborist program.
- Proof of insurance.
- A list of references (Don't hesitate to check.)
- Avoid using the services of any tree company that:
  - Advertises topping as a service provided. Knowledgeable arborists know that topping is harmful to trees and is not an accepted practice.
  - Uses tree climbing spikes to climb trees that are being pruned. Climbing spikes can damage trees, and their use should be limited to trees that are being removed.

### For Additional Information

More detailed information about pruning is available in *Tree-Pruning Guidelines*, prepared by the International Society of Arboriculture (ISA).

ISA offers several other brochures in this series that discuss many of the basic principles of tree care.

- Pruning Young Trees
- Why Topping Hurts Trees
- Mature Tree Care
- Recognizing Tree Hazards

- Insect and Disease Problems
- Plant Health Care
- Avoiding Tree and Utility Conflicts
- Benefits of Trees
- Tree Selection
- New Tree Planting
- Tree and Turf Relationships
- Buying High-Quality Trees
- Tree Values
- Why Hire an Arborist

This brochure is one in a series published by the International Society of Arboriculture as part of its Consumer Information Program. You may have additional interest in the following titles currently in the series: • Insect and Disease Problems • Mature Tree Care • New Tree Planting • Trees and Turf • Benefits of Trees • Tree Selection • Plant Health Care • Avoiding Tree and Utility Conflicts • Recognizing Tree Hazards • Why Hire an Arborist • Buying High-Quality Trees • Tree Values.



Developed by the International Society of Arboriculture, a non-profit organization supporting tree care research around the world and dedicated to the care and preservation of shade and ornamental trees.

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# Pruning Mature Trees



**P**runing is the most common tree maintenance procedure. Although forest trees grow quite well with only nature's pruning, landscape trees require a higher level of care to maintain their safety and aesthetics. Pruning should be done with an understanding of how the tree responds to each cut. Improper pruning can cause damage that will last for the life of the tree, or worse, shorten the tree's life.

### Reasons for Pruning

Since each cut has the potential to change the growth of the tree, no branch should be removed without a reason. Common reasons for pruning are to remove dead branches, to remove crowded or rubbing limbs, and to eliminate hazards. Trees may also be pruned to increase light and air penetration to the inside of the tree's crown or to the landscape below. In most cases, mature trees are pruned as a corrective or preventative measure.

Routine thinning does not necessarily improve the health of a tree. Trees produce a dense crown of leaves to manufacture the sugar used as energy for growth and development. Removal of foliage through pruning can reduce growth and stored energy reserves. Heavy pruning can be a significant health stress for the tree.

Yet if people and trees are to coexist in an urban or suburban environment, then we sometimes have to modify the trees. City environments do not mimic natural forest conditions. Safety is a major concern. Also we want trees to complement other landscape plantings and lawns. Proper pruning, with an understanding of tree biology, can maintain good tree health and structure while enhancing the aesthetic and economic values of our landscapes.





## When to Prune

Most routine pruning to remove weak, diseased or dead limbs can be accomplished at any time during the year with little effect on the tree. As a rule, growth is maximized and wound closure is fastest if pruning takes place before the spring growth flush. Some trees, such as maples and birches, tend to "bleed" if pruned early in the spring. This may be unsightly, but is of little consequence to the tree.

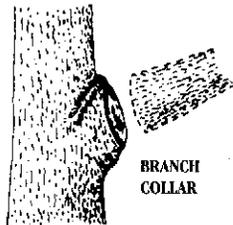
A few tree diseases, such as oak wilt, can be spread when pruning wounds allow spores access into the tree. Susceptible trees should not be pruned during active transmission periods.

Heavy pruning just after the spring growth flush should be avoided. This is when trees have just expended a great deal of energy to produce foliage and early shoot growth. Removal of a large percentage of foliage at this time can stress the tree.

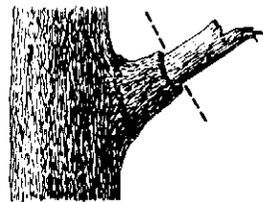


## Making Proper Pruning Cuts

Pruning cuts should be made just outside the branch collar. The branch collar contains trunk or parent branch tissue and should not be damaged or removed. If the trunk collar has grown out on a dead limb to be removed, make the cut just beyond the collar. Do not cut the collar.

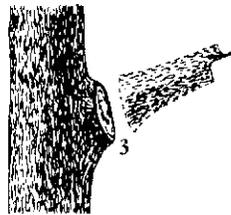
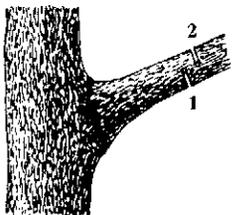


Pruning cuts should be made just outside the branch collar.



On a dead branch that has a collar of live wood, the final cut should be just beyond the outer edge of the collar.

If a large limb is to be removed, its weight should first be reduced. This is done by making an undercut about 12-18 inches from the limb's point of attachment. A second cut is made from the top directly



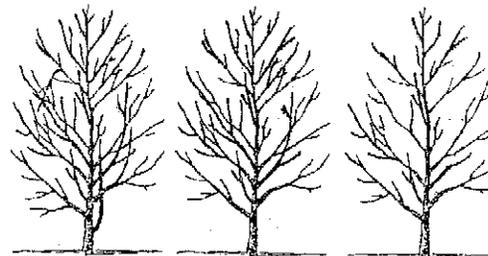
Use the 3-cut method to remove a large limb.

above or a few inches further out on the limb. This removes the limb leaving the 12-18 inch stub. The stub is removed by cutting back to the branch collar. This technique reduces the possibility of tearing the bark.



## Pruning Techniques

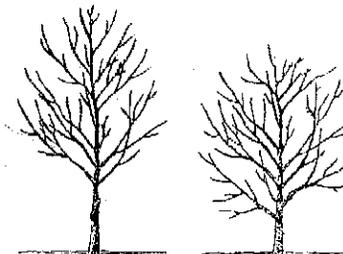
Specific types of pruning may be necessary to maintain a mature tree in a healthy, safe and attractive condition.



BEFORE

CROWN  
CLEANING

CROWN  
THINNING



CROWN  
RAISING

CROWN  
REDUCTION

**Crown cleaning** is the removal of dead, dying, diseased, crowded, weakly attached and low-vigor branches from the crown of a tree.

**Crown thinning** is the selective removal of branches to increase light penetration and air movement through the crown. Thinning opens the foliage of a tree, reduces weight on heavy limbs, and helps retain the tree's natural shape.

**Crown raising** removes the lower branches from a tree in order to provide clearance for buildings, vehicles, pedestrians and vistas.

**Crown reduction** reduces the size of a tree, often for clearance for utility lines. Reducing the height or spread of a tree is best accomplished by pruning back the leaders and branch terminals to lateral branches that are large enough to assume the terminal roles (at least one-third the diameter of the cut stem).

Compared to topping, this helps maintain the form and structural integrity of the tree.



## How much should be pruned?

The amount of live tissue that should be removed depends on the tree size, species, and age, as well as the pruning objectives. Younger trees will tolerate the removal of a higher percentage of living tissue than mature trees. An important principle to remember is that a tree can recover from several small pruning wounds faster than from one large wound.

A common mistake is to remove too much inner foliage and small branches. It is important to maintain an even distribution of foliage along large limbs and in the lower portion of the crown. Over-thinning reduces the tree's sugar production capacity and can create tip-heavy limbs that are prone to failure.

Mature trees should require little routine pruning. A widely accepted rule of thumb is never to remove more than one fourth of a tree's leaf bearing crown. In a mature tree, pruning even that much could have negative effects. Removing even a single, large-diameter limb can create a wound that the tree may not be able to close. The older and larger a tree becomes, the less energy it has in reserve to close wounds and defend against decay or insect attack. The pruning of large, mature trees is usually limited to the removal of dead or potentially hazardous limbs.



## Wound Dressings

Wound dressings were once thought to accelerate wound closure, protect against insects and diseases, and reduce decay. However, research has shown that dressings do not reduce decay or speed closure, and rarely prevent insect or disease infestations. Most experts recommend that wound dressings not be used. If a dressing must be used for cosmetic purposes, then only a thin coating of a non-toxic material should be applied.



## Hiring an Arborist

Pruning large trees can be dangerous. If pruning involves working above the ground, or using power equipment, it is best to hire a professional arborist. An arborist can determine what type of pruning is necessary to improve the health, appearance and safety of your trees. A professional arborist can provide the services of a trained crew, with all of the required safety equipment and liability insurance.