



Safety & Operations Manual

Wood Scrappers Tree Service

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Introduction

Wood Scrappers Tree Service is a family owned and operated arborist service. We are a certified arborist operated company and members of the Tree Care Industry Association and International Society of Arboriculture. We pride ourselves on professionalism, safety, knowledge, and efficiency.



Organization

Figure 1 displays the organization and reporting structure for Wood Scrappers Tree Service.

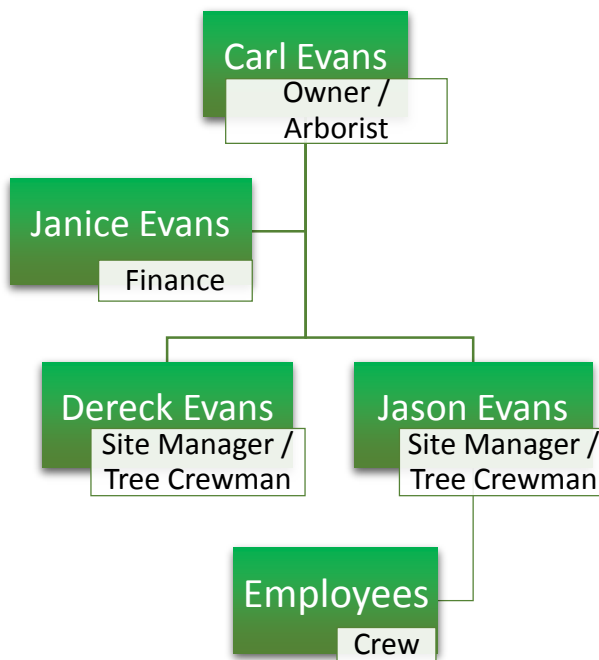


Figure 1: Organization

Statement of Purpose and Intent

Wood Scrappers Tree Service is providing this manual with the intentions to educate and prepare our employees for on-site operations. This manual will provide safety information for required equipment, work site checklist, traffic control, and on-site operations. We hope that this manual will prevent on-site injuries, equipment and property damages, and potential loss of life.

Safety Overview

Safety Overview

Working in the tree service industry safety is paramount. As of 2012 the arborist profession ranks among the 4th and 5th most dangerous in the United States with a fatal accident rate 10 times the average for all industries. However, our serious non-fatal injury rate, defined as temporary hospitalization, is on par with most. The distinction between our industry and others is when an accident occurs they are serious and are likely to result in death. These statistics alone speak to the technical difficulty and associated risk in the tree service industry. Figure 2 and 3 provide a statistical breakdown of civilian and professional accidents in 2012. *(Tree Care Industry Association)*

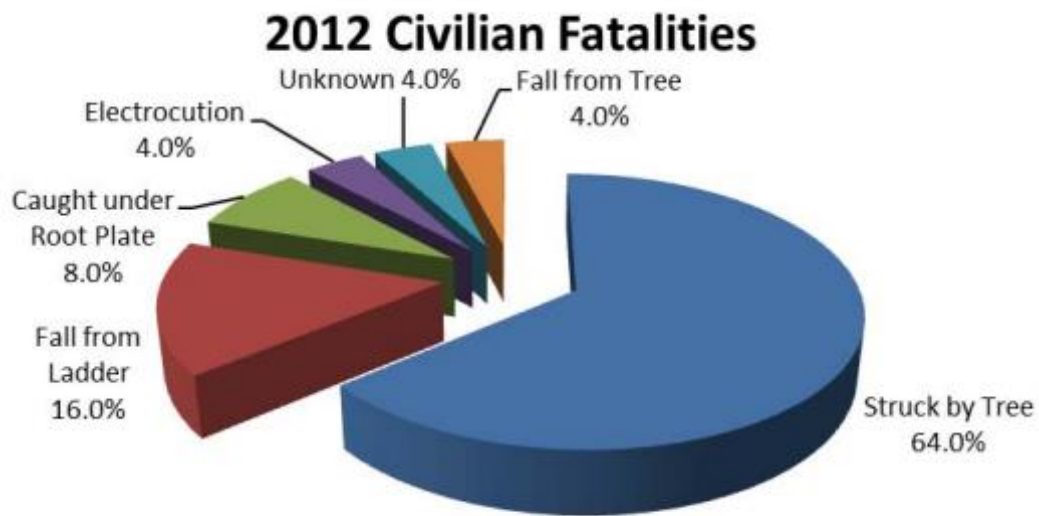


Figure 2 2012 Civilian Fatalities: TCIA

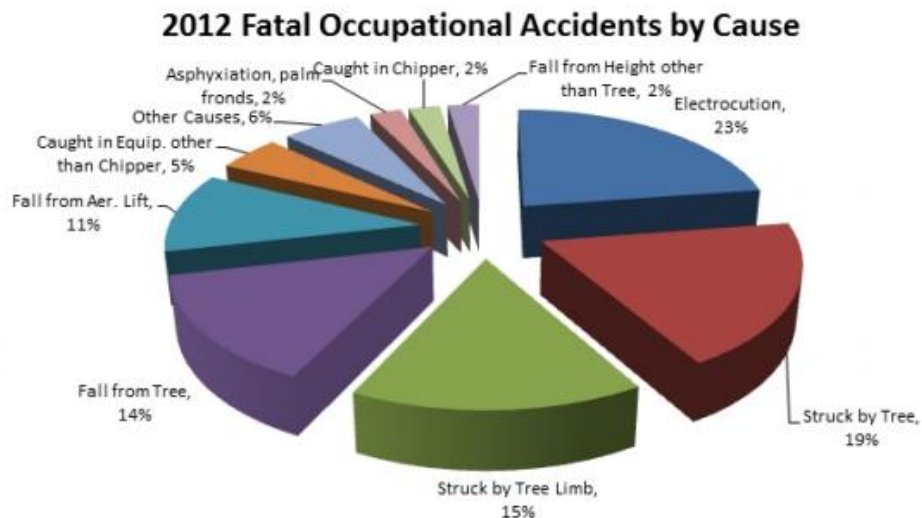


Figure 3: 2012 Fatal Occupations Accidents: TCIA

Personal Protective Equipment

Personal Protective Equipment (PPE)

The risk of serious injury is high and is the key reasons we require our employees to wear Personal Protective Equipment (PPE). There are situations in the everyday work environment that present potential hazards. If these hazards cannot be removed or mitigated personal protection should be employed to increase the safety of our employees. However, PPE should not be relied upon to protect against hazards, but be used in conjunction with proper safety procedures to further reduce the chance of bodily injury to oneself.

Personal Protective Equipment is not only for your protection, but further represents our business as responsible and professional.

American National Standard Institute (ANSI) Z133.1 safety standards state that all those engaged in arboricultural operations must wear eye protection and head protection at all times. (*International Safety Equipment Association*)

Headwear

Among the most important protection is headwear. While on the work site a helmet should be worn at all times. Helmets being worn should meet ANSI Z87.1 work standards. We wear two types of helmets:

- Standard Hard Hat
- Forestry Helmet System



Figure 4: Hard Hat



Figure 5: Forestry Helmet System: STIHL

Hard Hats

Standard Hard Hats are to be worn at all times while crews are clearing out brush in proximity of an active cutting site.

Forestry Helmet System

Forestry helmet systems are to be worn by all personnel operating, assisting, or in the immediate vicinity of chainsaws. The forestry helmet systems includes a hard hat, mesh face mask and noise canceling headphones. Despite having the mesh face mask, eye protection is still required to be worn as smaller particles can still penetrate the mask.

ANSI Z87.1 establishes performance criteria and testing requirements for devices used to protect the eyes and face from injuries. (*International Safety Equipment Association*)

Eye Protection

Eye protection is required to be worn at all times while on the work site. Eyewear comes in many different forms, but must meet ANSI Z87.1 work environment standards. We recommend employees wear shaded work lenses to provide protection from consistent exposure to sunlight. See Figure 6 for examples.



Figure 6: Eye Protection

Ear Protection

Ear protection is to be worn while operating, assisting, or in close proximity of chainsaws. We require ear protection to be worn as a part of our hearing conservation policy to reduce hearing loss in the work place. We recommend ear protection have a minimal noise reduction rating of 25 dB(A). See Figure 7 for examples.



Figure 7: Ear Protection

Hand Protection

Hand protection is required to be worn during active operation of chainsaws or during debris clearing. We recommend during the operation of chainsaws the employee wear cut resistant gloves for added protection. Additionally, we recommend employees use heavy hide gloves as some trees have thorns and other sharp hazards. See Figure 8 and 9 for glove examples.



Figure 8: Heavy Duty Work Gloves



Figure 9: Cut Retardant Gloves

Clothing

The clothing worn during work should be semi-form fitting to prevent catches or snags in equipment that may result in potential harm. We recommend our employees wear thick jeans and long sleeve shirts to protect against flying debris. We do not provide work uniforms and remind employees clothing worn on the job site will be damaged.

Additional Items

On occasion additional PPE may be required on specific job types. The additional PPE, if required, will be provided by Wood Scrappers Tree Service and employees will be instructed on their use on site. See Figure 10, 11, and 12 for examples. These items could include:

- Cutting Chaps
- Safety Vest
- Harness
- Respirator
- Dust Mask



Figure 10: Cutting Chaps



Figure 11: Harness



Figure 12: Respirator


Site Preparation

Site Preparation

Site preparation is the first step before operations ever begin. Site preparation includes various checklists, surveying, work orders, and hazard identification. We require all of these tasks to be completed and recorded prior to starting work.

Rigging for Removal

Rigging for removal is the task of identifying site hazards, tree hazard assessments, and many other safety checks. These are pre-designed forms to be filled out by the chief operator or site managers. Completed forms are available upon request should an employee be concerned about a particular hazard or identified trees for work. Figure 13 is a Rigging for Removal Checklist provided by TCIA.




RIGGING for REMOVAL CHECKLIST

for Tree Care Crews

This is not intended as a teaching tool, but simply as a checklist to aid in planning for qualified tree crews.

<p><input type="checkbox"/> Required permits filled out and approved</p> <p><input type="checkbox"/> Trees identified for removal</p> <p style="margin-left: 20px;"><input type="checkbox"/> Inventory number of tree(s) to be removed _____</p> <p style="margin-left: 20px;"><input type="checkbox"/> Species/height/dbh of tree(s) to be removed _____</p> <p><input type="checkbox"/> Reason for removal _____</p> <p><input type="checkbox"/> Site Hazard assessment</p> <p style="margin-left: 20px;">Potential targets in area (describe):</p> <p style="margin-left: 40px;"><input type="checkbox"/> Structures _____ mitigation _____</p> <p style="margin-left: 40px;"><input type="checkbox"/> Landscaping _____ mitigation _____</p> <p style="margin-left: 40px;"><input type="checkbox"/> Other property _____ mitigation _____</p> <p style="margin-left: 40px;"><input type="checkbox"/> Pets/people _____ mitigation _____</p> <p style="margin-left: 40px;"><input type="checkbox"/> Underground utilities? <input type="checkbox"/> Yes <input type="checkbox"/> No</p> <p style="margin-left: 40px;"><input type="checkbox"/> Vehicular traffic/pedestrians? <input type="checkbox"/> Yes <input type="checkbox"/> No</p> <p style="margin-left: 40px;"><input type="checkbox"/> Slopes? <input type="checkbox"/> Yes <input type="checkbox"/> No</p> <p style="margin-left: 40px;"><input type="checkbox"/> Biting or stinging insects or animals? <input type="checkbox"/> Yes <input type="checkbox"/> No</p> <p style="margin-left: 40px;"><input type="checkbox"/> Poisonous plants? <input type="checkbox"/> Yes <input type="checkbox"/> No</p> <p style="margin-left: 40px;"><input type="checkbox"/> Other Hazards? (describe) _____</p> <p><input type="checkbox"/> Tree Hazard Assessment</p> <p style="margin-left: 20px;"><input type="checkbox"/> Visual inspection (including the root collar); note condition of the:</p> <p style="margin-left: 40px;"><input type="checkbox"/> Main supporting roots _____</p> <p style="margin-left: 40px;"><input type="checkbox"/> Trunk _____</p> <p style="margin-left: 40px;"><input type="checkbox"/> Scaffold limbs _____</p> <p style="margin-left: 40px;"><input type="checkbox"/> Smaller branches in canopy _____</p> <p style="margin-left: 20px;"><input type="checkbox"/> Additional inspection, not limited to: root collar excavation, sounding the trunk, use of decay detection equipment.</p> <p><input type="checkbox"/> Take inventory of and load the equipment needed</p> <p style="margin-left: 20px;"><input type="checkbox"/> Crane (size, placement) _____</p> <p style="margin-left: 20px;"><input type="checkbox"/> Rope (sizes and lengths) _____ Tag lines _____ Bull lines _____</p> <p style="margin-left: 20px;"><input type="checkbox"/> Blocks _____ <input type="checkbox"/> Slings _____</p> <p style="margin-left: 20px;"><input type="checkbox"/> Wedges _____ <input type="checkbox"/> Lowering device(s) _____</p> <p style="margin-left: 20px;"><input type="checkbox"/> Materials handling equipment _____ <input type="checkbox"/> Other? _____</p> <p><input type="checkbox"/> Emergency Response/Aerial Rescue plan</p> <p>_____</p> <p>_____</p>	<p><input type="checkbox"/> Establish the work zone</p> <p style="margin-left: 20px;"><input type="checkbox"/> Landing zone _____</p> <p style="margin-left: 20px;"><input type="checkbox"/> Loading/chipping zone _____</p> <p style="margin-left: 20px;"><input type="checkbox"/> Location for wood debris disposal _____</p> <p style="margin-left: 20px;"><input type="checkbox"/> Estimated quantity of chips _____</p> <p style="margin-left: 20px;"><input type="checkbox"/> Estimated quantity of logs _____</p> <p style="margin-left: 20px;"><input type="checkbox"/> Dump chips/mulch onsite (location)? _____</p> <p style="margin-left: 20px;"><input type="checkbox"/> Traffic control _____</p> <p><input type="checkbox"/> Job Briefing, to cover:</p> <p style="margin-left: 20px;"><input type="checkbox"/> Tree/Site hazards</p> <p style="margin-left: 20px;"><input type="checkbox"/> Other hazards associated with the job</p> <p style="margin-left: 20px;"><input type="checkbox"/> Special precautions</p> <p style="margin-left: 20px;"><input type="checkbox"/> Specific work assignments</p> <p style="margin-left: 20px;"><input type="checkbox"/> PPE requirements</p> <p style="margin-left: 20px;"><input type="checkbox"/> Emergency action plan</p> <p style="margin-left: 40px;">Emergency contact info _____</p> <p style="margin-left: 40px;">Job location _____</p> <p><input type="checkbox"/> Contacts for</p> <p style="margin-left: 20px;"><input type="checkbox"/> Supervisor _____</p> <p style="margin-left: 20px;"><input type="checkbox"/> Utilities _____</p> <p style="margin-left: 20px;"><input type="checkbox"/> Property owner _____</p> <p><input type="checkbox"/> Job phases and steps</p> <p style="margin-left: 20px;"><input type="checkbox"/> Phase one</p> <p style="margin-left: 40px;">Brush out the tree first leaving workable crotches and limbs for later. Think ahead of your plan so you don't take something off now and regret not being able to use it later in the rigging plan.</p> <p style="margin-left: 40px;">Keep up with brush removal. But don't get too far ahead of your groundie.</p> <p style="margin-left: 20px;"><input type="checkbox"/> Phase two, large limb removal _____</p> <p style="margin-left: 20px;"><input type="checkbox"/> Phase three, trunk removal _____</p> <p><input type="checkbox"/> Stump Removal</p> <p style="margin-left: 20px;">Number of stumps _____</p> <p style="margin-left: 20px;">Beginning height of stumps above grade _____</p> <p style="margin-left: 20px;">Desired depth of stumps below grade _____ inches</p> <p style="margin-left: 20px;">Estimated total measurement (inches/feet/cm) of stump to grind _____</p> <p style="margin-left: 20px;">Access details</p> <p style="margin-left: 40px;">Access route _____</p> <p style="margin-left: 40px;">Gate width _____</p> <p style="margin-left: 40px;">Other _____</p>
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TREE CARE INDUSTRY ASSOCIATION, INC. Established 1938
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MEM-REVI-12/08

Figure 13: TCIA Rigging for Removal Checklist

Work Order


Work orders are semi-redundant forms that will be filled out by the chief operator or site managers. The work order provides information on each job site. The order outlines customer information, personnel needed, equipment needed, in addition to, specific tree type information, location of work, and type of work to be performed. A work order is required and documented for every job. Figure 14 is our work order form.

WORK ORDER

WOOD SCRAPPERS TREE SERVICE


CARL EVANS
Cell 903-243-0424 Hm: 903-454-2854

SERVING HUNT COUNTY AND SURROUNDING AREAS




THE GREENVILLE CHAMBER
CONVENTION &
VISITORS BUREAU


MEMBER



TCIA
VOICE OF TREE CARE



MEMBER



CERTIFIED
ARBORIST

Customer Proposal submitted by: _____

Customer name: _____

Address: _____

Phone: home _____ cell _____ e-mail _____

Personnel needed	Equipment needed	Job safety checklist	
<input type="checkbox"/> Bucket Operator	<input type="checkbox"/> Bucket	<input type="checkbox"/> Chipper	<input type="checkbox"/> Initial tree/site hazard inspection
<input type="checkbox"/> Climbers	<input type="checkbox"/> Dump	<input type="checkbox"/> Mower	<input type="checkbox"/> Job site hazard walk-thru
<input type="checkbox"/> Ground Person	<input type="checkbox"/> Pickup/trailer	<input type="checkbox"/> Hedge trimmer	<input type="checkbox"/> Job briefing held
<input type="checkbox"/> Stump grinder operator	<input type="checkbox"/> Stump grinder	<input type="checkbox"/> Pole Tool	<input type="checkbox"/> Signs/cones set out for Roadside work
<input type="checkbox"/> Driver			
<input type="checkbox"/> Other	<input type="checkbox"/> Other	<input type="checkbox"/> Other	

List any additional supplies needed: _____

Tree/Shrub	Location	Work to be performed
_____	_____	_____
_____	_____	_____
_____	_____	_____
_____	_____	_____

Consultation date: _____ Acceptance date: _____ Work completed date: _____

Signature _____

Figure 14: Wood Scrappers Work Order

Traffic Control

Traffic control is a key element to site preparation. Not all work sites require traffic control, but any work that requires personnel or equipment to enter roadways, traffic control measures must be employed for everyone’s safety.

The goal of traffic control is to minimize work site impacts on pedestrians and prevent a potential hazard. There are various measure that are used during traffic control, most commonly road cones. Our work commonly interferes with traffic for short durations, being several hours for a single day. As most of our work occurs on low traffic roadways the cone placement is dependent on current speed limits. Traffic control will often be established by the chief operator or site managers. Figure 15 provides a general outline for traffic control measures.

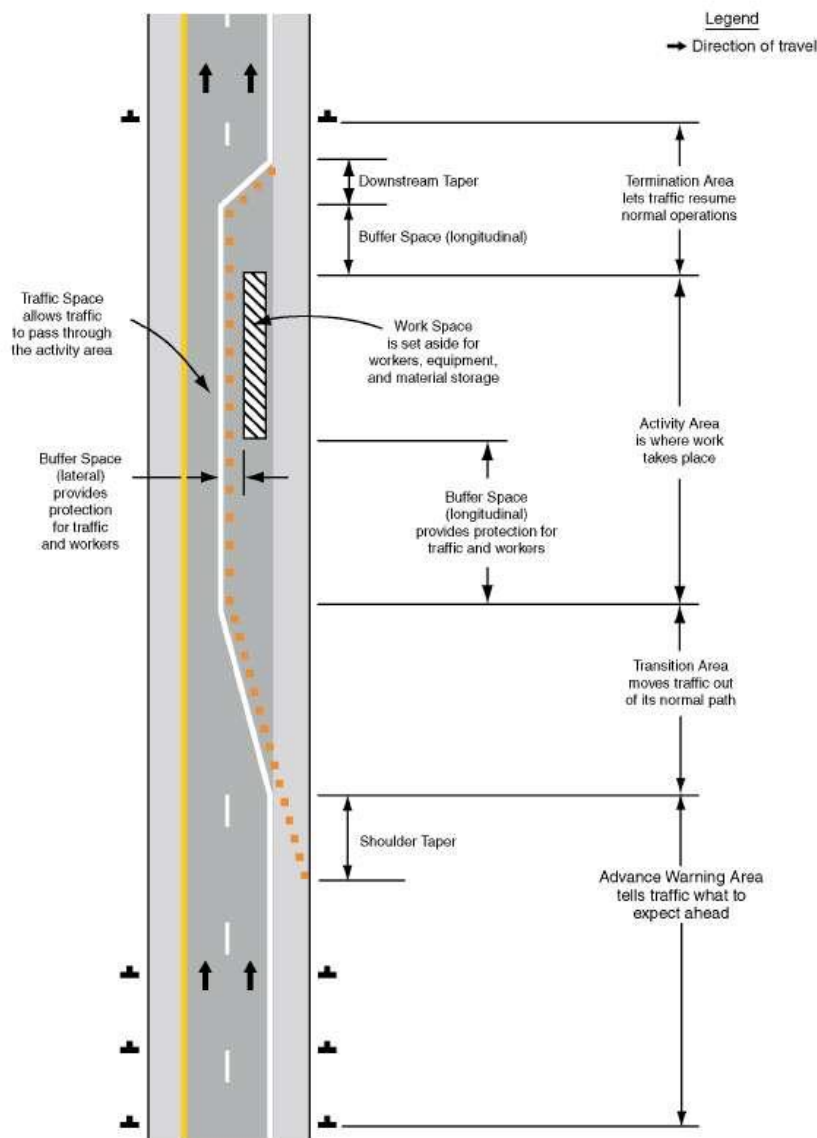


Figure 15: Traffic Control Example



Chainsaws

Chainsaws

Chainsaws are the core tools of the arborist profession. Before operating our equipment every employee is required to go through a hands on safety and operations course. There are many different types of chainsaws. Fundamentally, each chainsaw requires the same maintenance and operates the same; however, saw weight and handling during cutting differ.

Common Chainsaw Incidents

During the operation of a chainsaw there are many opportunities for an accident to occur by operator error or unexpected happenstance.

Kickback

Kickback occurs when a chain tooth towards the tip of the guide bar catches on wood, cutting through it. This action propels the rotating chain back at the operator which can result in serious injury or death.

Snapping Chain

Incidents during cutting often occur with a poorly maintained chain. Unsharpened chains may result in the chain to break during rotation, propelling the elongated chain at the operator. This incident can result in serious injury or death.

Chainsaw Safety Tips

- Stand off to the side of the saw so if a mishap occurs the saw does not come directly at you
- Operate a chainsaw with both hands
- Stand out of the way of limbs you are cutting
- Check your surrounding for personnel before cutting
- Keep your body away from the chains

Standard Chainsaws

Standard chainsaws are those with a medium to long bar and often used to cut felled logs or low hanging limbs. Figure 16 shows the nomenclature for a standard chainsaw.

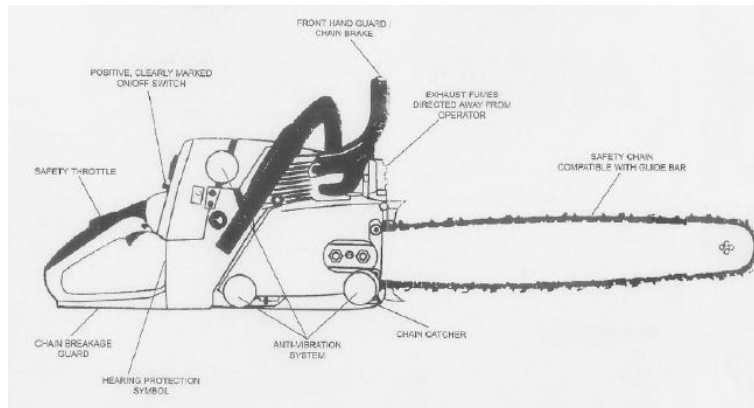


Figure 16: Chainsaw Nomenclature

Our chainsaws vary in size, length, and power. Each chainsaw serves specific purposes or used for specific types of trees. Figure 17 and 18 are some examples of these saws.



Figure 17: MS 880, 59" bar



Figure 18: MS 362, 25" bar

In-Tree Saws

In-tree saws are lightweight chainsaws that are specifically designed to be operated with one hand. These saws should be operated by experience personnel as it often require the individual to multi-task with climbing or suspension equipment. Due to the one handed nature of this saw it includes an emergency drop switch. The drop switch is a pin that attaches to the user that instantly shut the saw off if it is dropped. Figure 19 is an example of an in-tree saw.



Figure 19: MS 201, 16" bar

Pole Saws

Pole saws are elongated saws that increase the reach of the user. These saws are typically used for pruning and shaping hard to reach places that are too high to reach, but not high enough for lift equipment. Pole saws are set at a fixed length. Due to the elongated nature of the saw it is fairly difficult to handle and requires substantial strength to wield. Figure 20 is an example of a fixed length pole saw.



Figure 20: Fixed Pole Saw

Telescopic Pole Saws

Telescopic Pole Saws are similar to fixed pole saws, but have a telescopic extension. This allows the saw to be extended to even further lengths. However, the added length to the saw makes it extremely difficult to handle. Additionally, the weight is distributed unevenly further increasing the difficulty of handling and should only be used by experience professionals. Figure 21 is an example of a telescopic pole saw.



Figure 21: Telescopic Pole Saw

Manual Tools

Manual Tools

Manual tools are tools that are powered by hand. These tools are often employed when a malfunction occurs in chainsaw equipment. Such incidents occur if a chain is caught deep in a tree or when making very low cuts on stumps. Manual tools are also employed for complex cuts or light pruning work.

Hammers / Wedges

Hammers and wedges are some of the most common tools employed when felling tree or shortening stumps for grinding. Wedges are often employed if chainsaws are caught deep in a tree or to assist in nearly ground level cuts. Wedges come in different forms, rubber or metal, and different sizes.

We often employ heavy hammers to drive wedges into chainsaw cuts. Most of our hammers are two-handed or one-handed sledgehammers. See Figure 22 and 23 for examples.



Figure 22: One-handed Sledgehammer



Figure 23: 5lb Wedge

Safety Tips

- Keep fingers away from striking surfaces
- Secure wedges firmly before striking

How to use

- Place wedge securely in cut
- Lightly tap the strike face of the wedge to push it further into the cut
- Ensure the wedge is secure a final time
- Forcefully strike the wedge to split or separate the wood

Figure 24 demonstrates the employment of a wedge.



Figure 24: Wedge

Axes / Hatchets

Axes are often employed in the same manner hammers and wedges are. We often use axes and hatchets to make large debris more manageable. These tools can also be used to replace standard wedges if none are available. Figure 25 and 26 displays a hatchet and axe.



Figure 25: One-handed Hatchet



Figure 26: Two-handed Axe

How to use

- Keep body parts from the blade
- Ensure personnel are not in the vicinity of swinging arc
- Maintain a firm grip while using
- Strike in an angled fashion to create a “V” shaped cut

Ropes / Chains

We use ropes and chains in our daily work. Most commonly, they are used to tie off large limbs to lower them safely or to pull large limbs away from potential hazards like houses, fences, or sheds. We also use chains to drag brush off of trailers. There are numerous methods and techniques to be employed when using limb hitches. These techniques will only be used by site managers or the chief operator.

Additional Equipment

Additional Equipment

On occasion we will employ large specialty devices. These devices are only to be used on specific job types and all employees will be informed if the equipment is to be used. We often outsource the operating of this equipment to partner companies who specialize in these devices. As the use of these devices are rare, site managers and the chief operator will be the only personnel to operate this equipment, with exception to a wood chipper.

Wood Splitter

A wood splitter (log splitter) is a gas powered machine with a sharp wedge attached to the end of a high powered piston. When initiated the piston strikes through the center of the log, splitting it in half. See Figure 27 for an example of a wood splitter.



Figure 27: 34 Ton Gas Wood Splitter

Stump Grinder

A stump grinder is a gas powered piece of machinery with a large circular blade at the tip. The stump grinder resembles a giant rotary saw used to grind stumps and roots of a tree. Figure 28 is an example of a stump grinder. These tools are extremely dangerous and should only be operated by a well-trained individual.



Figure 28: Stump Grinder

Wood Chipper

A wood chipper is a mechanical chute with hundreds of rotary blades. This tool is used to shred tree debris into wood flakes. We only use this tool when there are copious amounts of wood debris. These tools make it easy to transport debris away from work sites.

Safety Tips

- Keep a safe distance at all times from the entrance and exit of the wood chipper
- Keep arms and hands away from moving parts
- Wear eye and head protection during operation

See Figure 29 for an example of a wood chipper.



Figure 29: Wood Chipper

TA35 Bucket Truck

TA35 Bucket Truck

The TA35 Bucket Truck is our standard vehicle to reach extremely high places in trees. The bucket truck offers a large amount of carrying capacity for us to carry the majority of our smaller tools. See Figure 30 for an example of the TA35 Bucket Truck.



Figure 30: TA35 Bucket Truck

Safety

The TA35 Bucket Truck is an individual operated piece of equipment. On occasion an employee maybe required to use the bucket truck. Before an employee operates the bucket truck they will be thoroughly briefed on the operation and safety procedures. Below is a list of general safety rules while operating the bucket truck.

- Level the vehicle
- Conduct operation checks before using
- Secure personal safety harness to bucket clasp
- Secure saw harness
- Keep all ground personnel at a distance while lift is being operated

Nomenclature

The Figure 31 diagram will outline the key components of the TA35 Bucket Truck.

Terminology Diagram

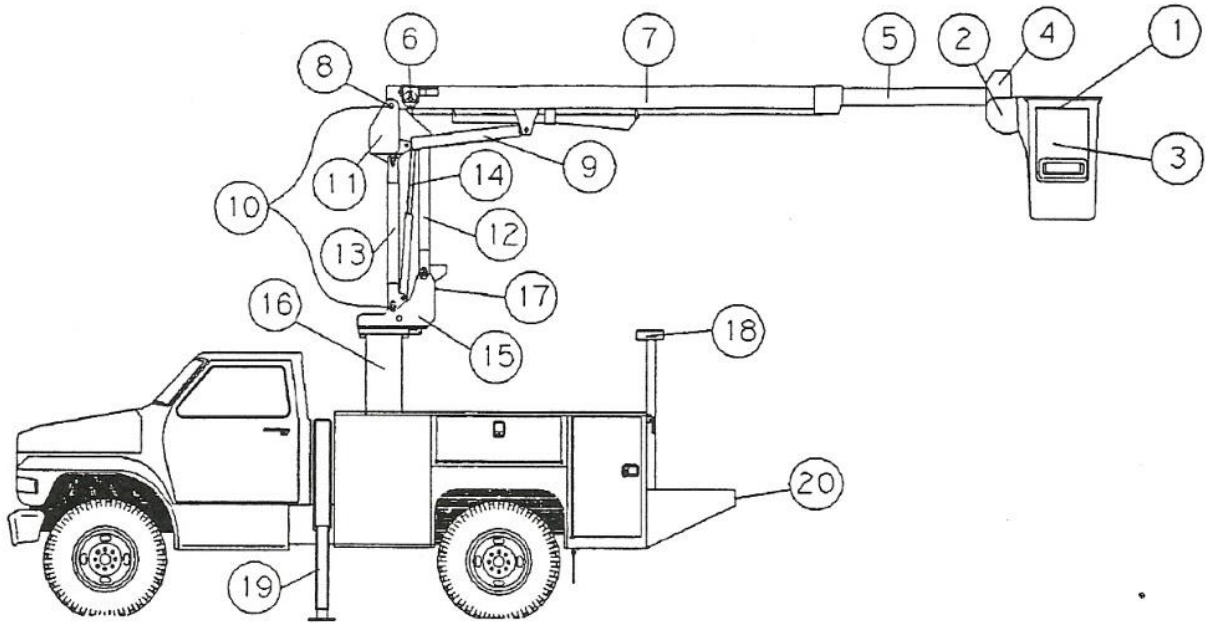


Figure 31: TA35 Bucket Truck, Altec Industries

Terminology Definitions

1. **Upper Controls**
Those controls located in or beside the platform, designed for the movement functions of the unit.
 2. **Platform Pin**
The pin about which the platform rotates relative to the upper boom.
 3. **Platform**
The personnel-carrying component of the unit.
 4. **Upper Boom Tip**
The end of the upper boom that is farthest from the turntable.
 5. **Upper Boom**
The structural member attached to the lower boom that supports the platform.
 6. **Chain Extension System**
The mechanical system consisting of the motor, gearbox, chains, and sprockets that is used to extend and retract the upper boom.
 7. **Lower Boom**
The structural member that supports the upper boom.
 8. **Lower Boom Pin**
The horizontal pin that connects the lower boom to the articulating arm.
 9. **Lift Cylinder**
The hydraulic cylinder that moves the booms up and down.
 10. **Articulating Arm**
The system for lifting the aerial device booms. This system includes the arm, link, riser and the articulating arm cylinder.
 11. **Riser**
Structure that connects the articulating arm to the lower boom.
 12. **Link**
The secondary load-carrying structure for the articulating arm.
 13. **Arm**
The primary load-carrying structure for the articulating arm.
 14. **Articulating Arm Cylinder**
The hydraulic cylinder that moves the articulating arm up and down.
 15. **Turntable**
The rotating base of the unit which supports the booms and articulating arm.
 16. **Pedestal**
The stationary base of the unit that supports the turntable.
 17. **Lower Controls**
The controls on the vehicle, turntable, pedestal, or in a bed compartment designed for the movement functions of the unit.
 18. **Boom Rest Bracket**
The structural member attached to the chassis or body to support the boom in the travel or rest position.
 19. **Outriggers**
The structural members, which when properly extended or deployed on firm ground, assist in stabilizing the vehicle on which the unit is mounted.
 20. **Outrigger Controls**
The controls for operating the outriggers.
- Stabilizers (not shown on diagram)**
An optional means to assist in stabilizing the vehicle, such as outriggers, torsion bars, and spring lockouts.

Figure 31: Continued

Tree Operations

Tree Operations

As an arborist service we conduct many types of tree operations. Some of our operations include pruning, dead wooding, and felling.

Pruning

Pruning is the selective removal of branches to shape a tree to specific standards. See Figure 32.

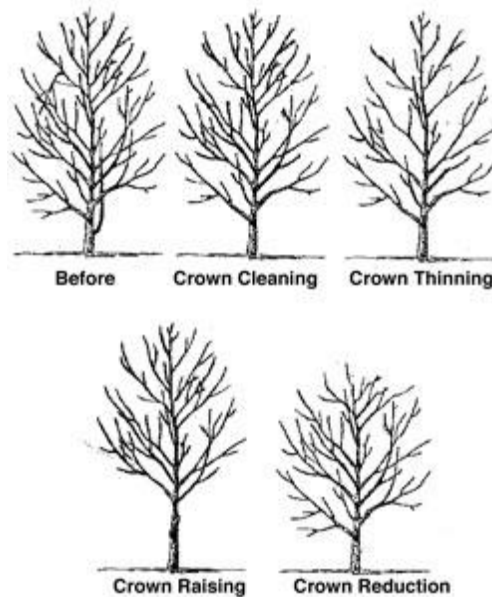


Figure 32: Types of Pruning

Dead Wooding

Dead wooding is the process of removing dead limbs out of trees. This is typically a very long and arduous task. Dead limbs will be removed to ensure no further harm comes to the tree.

Felling

Felling is the process of taking down an entire tree. This is the most dangerous task and requires technical skills of a highly trained professional. Tree felling is to only be conducted by the arborist and experienced tree crew. During this process the arborist will conduct the cutting and notching of the tree while the selected tree crew maintain guide chains/ropes and a clear drop area. See Figure 33.



Figure 33: Tree Felling

Image Citation

Cover Image: <http://illinoisarborist.org/services-we-provide/become-certified/>

Figure 2: TCIA, 2012 What kills Tree Care DIY-ers? : <http://tcia.org/sites/tcia.org/files/public/resources/2012-civilian-accidents-20130117.pdf>

Figure 3: TCIA, 2012 Tree Care Occupation Fatalities & Injuries: <http://tcia.org/sites/tcia.org/files/public/resources/2012-occupational-accidents-edited-20130121.pdf>

Figure 4 – 10, 17-20: Safety / Tree Care Equipment: <http://www.stihlusa.com/>

Figure 11: Safety Harness: <http://www.ebay.com/itm/Rock-Empire-Skill-Tree-Harness-Arborist-Tree-Surgeon-Climbing-Harness-/271121654510>

Figure 12: Respirator: http://www.forestry-suppliers.com/product_pages/Products.asp?mi=41991

Figure 13: Rigging for Removal Checklist: TCIA.org (MEM-REV1-12/08)

Figure 15: Traffic Control Example: http://safety.fhwa.dot.gov/xings/com_roaduser/07010/sec06.htm

Figure 16: Chainsaw Diagram: http://www.lowimpact.org/factsheet_chainsaws.html

Figure 21: Telescopic Pole Saw: <http://www.amleo.com/echo-power-pruner-extra-long-reach-25+4cc-vortex-engine-12ft-2in-shaft/p/PPT265/>

Figure 22: Hammer: <http://www.amazon.com/TEKTON-3110-Fiberglass-Sledge-Hammer/dp/B000NQ4OTO>

Figure 23: Wedge: <http://www.menards.com/main/tools-hardware/hand-tools/axes-mauls/yardworks-5-lb-splitting-wedge/p-1812170-c-13244.htm>

Figure 24: Wedge Diagram: <http://www.learnersdictionary.com/definition/wedge>

Figure 25: One-handed Hatchet: <http://www.photo-dictionary.com/phrase/2614/hatchet.html>

Figure 26: Two-handed Axe: <http://shop.modernfarmer.com/shop/kaufmann-mercantile/american-made-felling-axe/>

Figure 27: Wood Splitter: <http://www.homedepot.com/p/Ariens-211-cc-34-Ton-Gas-Log-Splitter-917002/100671586>

Figure 28: Stump Grinder: <http://www.littlebeaverstumps.com/>

Figure 29: Wood Chipper: http://www.robinsons1874.com/rental/rayco_rc12_Chipper.html

Figure 30: TA35 Bucket Truck: <http://vehicles.oodle.com/view/1998-international-4700-altec-ta35-40-bucket-truck/3541751548-norwalk-ca/>

Figure 31: TA35 Bucket Truck Terminology / Diagram: Altec Industries TA35 Manual

Figure 32: Types of Pruning: <http://beeghlytree.com/resources/pruning-information/>

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