



HMTRI-NIEHS Hurricane Katrina Tree Removal Safety Training Handout

Introduction

The HMTRI-NIEHS Hurricane Katrina Tree Removal Safety Training Handout in accordance with ANSI Z133.1-2000 “Pruning, Repairing, Maintaining and Removing Trees and Cutting Brush-- Safety Requirements” establishes basic safety principles and work practices that are capable of protecting employees who are performing tree removal work. This document also references applicable logging operations as defined in 29 CFR 1910.266, USACE EM 385-1-1 Section 31, and other related standards. This document is intended only as a guidance handout to highlight those safety measures necessary for achieving a safe and healthy work environment during Katrina tree debris removal operations.

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1. The Workplace Supervisor

- 1.1. has a primary responsibility for implementing a Tree Safety Program in the workplace and:
- 1.2. Ensures workers know and follow Tree Removal Safety Guidelines and best practices
- 1.3. Ensures that training has been provided.
- 1.4. Ensures all equipment is safe, maintained, inspected and used correctly.
- 1.5. Ensures that the required level of personal protective equipment is available, in working order, and that specific training in its use has been provided
- 1.6. Investigates accidents and make recommendations to prevent reoccurrence.
- 1.7. Actively seeks suggestions for improvement from workers.
- 1.8. Keeps a log of all workers trained for the Tree Removal Operations and topics that were covered before they work in the area.
- 1.9. Ensures all workers have access to a copy of the Tree Removal Safety Guidelines.
- 1.10. Observes workers, work practices and site operations and makes corrections when necessary
- 1.11. Enforces the program.

2. The Worker

- 2.1. must be alert to and aware of the hazards of tree work and
- 2.2. Know the Tree Care Safety Guidelines.
- 2.3. Follow the procedures, as trained.
- 2.4. Inspect equipment.
- 2.5. Maintain equipment.
- 2.6. Report any anomalies to the supervisors.
- 2.7. Ensure the equipment is used as the manufacturer recommends.

3. Standard Operating Procedures

3.1. Traffic Control

- 3.1.1. When tree maintenance operations are going to interrupt the flow of pedestrian or vehicular traffic, effective means for controlling that traffic shall be instituted.
- 3.1.2. A perimeter barrier shall be established to identify the work zone area. Signs, cones, barricades or traffic control officers should be used to redirect or control the movement of pedestrians and vehicles outside of the work zone

3.2. Fire Protection

- 3.2.1. Gasoline powered equipment shall be refueled only when the engine is off. Spilled fuel must be removed before restarting.
- 3.2.2. Keep other running equipment, smoking and other ignition sources at least 10 feet away from the refueling area.
- 3.2.3. In some cases where refueling areas are a continuous operation a portable fire extinguisher must be located within reach.

4. Electrical Hazards

- 4.1. All overhead and underground electrical conductors and all communication wires and cables shall be considered energized with potentially fatal voltages.
- 4.2. Only qualified workers shall be assigned to work where an electrical hazard exists in accordance with ANSI Z133.1 Section 5 and 29 CFR 1910.269 “Electric Power Generation, Transmission, and Distribution”.
- 4.3. If a felled tree makes contact with any power line, the employee shall contact the power company and remain clear of the area until the power company advises that there are no electrical hazards.

5. Environmental Hazards

- 5.1. Tree removal operations are not permitted during adverse weather conditions such as thunderstorms, high winds, and snow and ice storms, and shall be suspended when storms approach.

6. Climbing

- 6.1. The following procedures should be used for climbing:
 - 6.1.1. A second tree care worker or other worker trained in emergency procedures shall be within visual or voice communication when a tree care worker is working above 12 feet.
 - 6.1.2. A visual hazard assessment shall be performed prior to climbing, entering, or performing any work in the tree.
 - 6.1.3. Tree removal workers shall be tied in or secured while ascending, completing work in, or descending the tree.
 - 6.1.4. A tree removal worker does not need to be tied in or secured when ascending a ladder to gain access to a tree; however, the tree care worker shall not work from or leave the ladder until they are tied in or secured.
 - 6.1.5. Tree care workers shall have available a minimum of two means of being secured while working aloft; for example, a climbing line and a work-positioning lanyard.
 - 6.1.6. A tree care worker shall tie in well above the work position to prevent an uncontrolled pendulum swing in the event of a slip
 - 6.1.7. A figure-eight knot shall be tied in the end of the climbing line to prevent pulling the rope through the climbing hitch, when working at heights greater than one-half the length of the climbing line.
 - 6.1.8. Tree care workers should maintain three points of contact, whenever possible, while climbing.

7. Tree Trimming

- 7.1. The following procedures should be used when trimming trees:
 - 7.1.1. Communications shall be established between the tree care workers aloft and the workers on the ground before cutting and dropping limbs.
 - 7.1.2. The command “stand clear” from aloft and “all clear” from the ground are terms that may be used for this purpose.
 - 7.1.3. Tree removal workers and other workers returning to the work area shall be acknowledged by tree care workers aloft.
 - 7.1.4. A separate work line shall be attached to limbs that cannot be dropped safely or controlled by hand. Climbing lines and work lines shall not be secured to the same crotch.

- 7.1.5. All cut branches shall be removed from trees before completion of work
- 7.1.6. Pole pruners and pole saws, when hung, shall be securely positioned to prevent dislodgement and shall be removed when a tree care worker leaves a tree.
- 7.1.7. Saw sheaths and scabbards and closed folding saws shall be hooked to the saddle when not in use.
- 7.1.8. Tree removal workers and other workers on the ground shall not stand under the work area of a tree when a cabling system is being installed.
- 7.1.9. Tree care workers in trees should be positioned off to one side in order to avoid injury in case of cable system failure.
- 7.1.10. Cabling tools shall be carried in a bag or on a belt designed to hold such tools, or attached to a tool lanyard.
- 7.1.11. Tree care workers performing lowering operations shall inspect trees to determine if the tree can withstand the strain of lowering procedures, and if not, provide other means of lowering branches.
- 7.1.12. Tree care workers in the tree should be above or to the side of the limb being lowered, when large limbs are lowered in sections.
- 7.1.13. When large cuts are being made in single-spar trees, both ends of the work-positioning lanyard should be attached to a single point on the saddle to prevent injury should the spar split.

8. Tree Felling and Removal

- 8.1. The following procedures should be used when felling and removing trees
 - 8.1.1. A site assessment shall be done before cutting and removing any tree. The tree care worker and their supervisor shall consider the following factors in their plan to safely remove the tree
 - 8.1.1.1. Surrounding area including other trees
 - 8.1.1.2. Species, height, and shape of tree
 - 8.1.1.3. Lean of tree
 - 8.1.1.4. Loose limb and other overhead materials
 - 8.1.1.5. Decayed or weak spots (be aware of additional hazards if these conditions exist in the hinge area)
 - 8.1.1.6. Wind force and direction
 - 8.1.1.7. Fall location relative to persons, property, and electrical conductors
 - 8.1.2. A job briefing shall be held with all crew members before commencing work.
 - 8.1.3. Workers shall be positioned and their duties organized so that the actions of one worker will not create a hazard for any other worker.
 - 8.1.4. A planned escape route for all workers shall be prepared before cutting any standing tree or trunk.
 - 8.1.4.1. The preferable escape route is 45 degrees on either side of a line drawn opposite the intended direction of the fall.
 - 8.1.4.2. The chain saw operator shall use this path for egress once the cut has been completed.
 - 8.1.5. Workers not directly involved shall be clear of the work area.
 - 8.1.6. Workers returning to the work area shall not enter until the chain saw operator has acknowledged that it is safe to do so.

- 8.1.7. All limbs shall be trimmed to a height and width sufficient to allow the tree to fall clear of any wires and other objects in the vicinity.
- 8.1.8. Wedges, block and tackle, rope, wire cable (except where an electrical hazard exists) or other appropriate devices shall be used when there is a danger that the tree or trees being removed may fall in the wrong direction or damage property.
- 8.1.9. Notches shall be used on all trees and trunks over 5 inches in diameter at breast height.
- 8.1.10. Notches and back cuts shall be made at a height above the highest ground level to enable chain saw operators to safely begin the cut, control the tree or trunk and have freedom of movement for escape.
- 8.1.11. Notches shall be 45 degrees or greater and large enough to guide the fall of trees and trunks to prevent splitting.
- 8.1.12. Notch depth should not exceed one-third of the diameter of the tree.
- 8.1.13. The back cut shall not penetrate into the predetermined hinge area.
- 8.1.14. With a conventional notch or Humboldt notch, the back cut shall be 1—2 inches above the apex of the notch to provide an adequate platform to prevent kickback of the tree or trunk. With an open-face notch (greater than 70 degrees), the back cut should be at the same level as the apex of the notch.
- 8.1.15. The two cuts that form the notch shall not cross at the point where they meet.
- 8.1.16. Before commencing the back cut, there shall be a command such as “stand clear” from the tree care worker operating the chain saw and a response such as “all clear” from the workers supporting the removal operation.
- 8.1.17. Once the back cut has been completed, the chain saw operator shall immediately move a safe distance away from the tree or trunk on the planned escape route.
- 8.1.18. Visual contact should be maintained with the tree or trunk until it is on the ground.

9. Limbing and Bucking

- 9.1. The following procedures should be used when limbing and bucking:
 - 9.1.1. Chain saws should be operated away from the vicinity of the legs and feet. Employ natural barriers where possible, such as limbs between the saw and the body. Whenever possible, cut on the opposite side of the log from you.
 - 9.1.2. Maintain sight of the tip of the saw to prevent kickback
 - 9.1.3. Do not limb above your shoulders.
 - 9.1.4. The preferred working position is on the uphill side of the work.
 - 9.1.5. When necessary to prevent rolling, logs shall be blocked with wood or other suitable material.
 - 9.1.6. Trees, segments of trees, limbs or saplings under stress or tension due to pressure or weight of another object are hazardous and shall be removed by mechanical means such as pulling down with a cable.
 - 9.1.7. Trees that have become lodged in adjacent trees are especially dangerous and shall be removed by mechanical means. NEVER walk underneath the lodged tree.

9.1.8. Wedges should be used as necessary to prevent binding of the guide bar or chain when bucking up trunks of trees.

9.1.9. Cant hooks or peaveys should be used as an aid in rolling large or irregular logs to complete bucking.

10. Brush Chipping

10.1. The following procedures should be used when chipping brush

10.1.1. Remove brush to a designated location for chipping, so that hazards are not created in the tree cutting area.

10.1.2. Brush and logs shall be fed into chippers, butt or cut end first from the side of the feed table centerline, and the operator shall immediately turn away from the feed table when the brush is taken into the rotor or feed rollers.

10.1.3. The brush chipper discharge chute or cutter housing cover shall not be raised or removed while any part of the chipper is turning or moving.

10.1.4. Do not feed foreign materials such as stones, nails, sweepings or rakings into chippers.

10.1.5. Do not wear loose clothing, climbing equipment, body belts, or gauntlet-type gloves during chipper operation.

10.1.6. Do not place hands or other body parts into the infeed hopper. Use a long stick to assist branches into the hopper.

11. Equipment Specific Operating Procedures

11.1. All Vehicles and Mobile Equipment. The following procedures should be used for all vehicles and mobile equipment that are being used for tree care operations:

11.1.1. Vehicles and equipment must be visually inspected daily by the operator in accordance with manufacturer's instructions.

11.1.2. Use of equipment should be within the manufacture's instructions and safe guards.

11.1.3. Only trained and properly qualified employees will be permitted to operate such equipment.

11.1.4. Safety seatbelts will be worn at all times when vehicle is in motion.

11.1.5. Any vehicle or mobile equipment should be turned off and properly locked-out before any repairs or adjustments are made. Any defects or malfunctioning equipment must be corrected before placing equipment back in service

11.1.6. Any vehicle with a rear view obstruction or being towed will require a spotter to assist the driver in backing up.

11.1.7. Any materials or equipment carried on the vehicles must be properly stored and secured to prevent falling or damage.

11.1.8. Riding outside or on top of vehicles is not permitted.

11.1.9. If the vehicle is left unattended then the keys must be removed during that period of time.

12. Aerial Devices

12.1. The following procedures should be used when operating aerial devices:

12.1.1. Aerial devices must have a point of attachment to secure a full body harness with a shock absorbing lanyard or body belt and lanyard. Fall protection must be worn when working aloft.

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- 12.1.2. Loads shall not exceed manufacturer's ratings, which shall be posted on the aerial device.
- 12.1.3. Aerial devices shall not be used as a crane or hoist to lift or lower materials, unless specifically designed by the manufacturer to perform such operations.
- 12.1.4. Wheel chocks shall be set before using.
- 12.1.5. The operator shall ensure adequate clearance and give warning prior to lowering outriggers.
- 12.1.6. Pads shall be set under outrigger feet when needed to ensure stable footing.
- 12.1.7. The operator shall look in the direction of travel of the bucket and be aware of the location of the booms in relation to all other objects and hazards
- 12.1.8. Clearances from passing vehicles shall be maintained or traffic control shall be provided when booms or buckets are operated over roads.
- 12.1.9. One-person buckets shall not have more than one person in them during tree work.
- 12.1.10. Booms or buckets shall not make contact with energized electrical conductors, poles, trees, or similar objects.
- 12.1.11. Electric cables (as used with electric saws, lights, or other conductive material) shall not be run from the vehicle to the bucket, when working in proximity to energized electrical conductors.
- 12.1.12. Aerial devices shall not be moved with a tree care worker in an elevated bucket, except for equipment that is specifically designed for such operations
- 12.1.13. During aerial device operations, tree care workers not engaged in line clearance shall maintain a minimum approach distance of 10 feet from energized electrical conductors.

13. Brush Chippers, Stump Cutters, and Log Splitters

- 13.1. The following procedures should be used when operating brush chippers, stump cutters, and log splitters:
 - 13.1.1. Employees must wear appropriate PPE including: hearing, eye and hand and body protection.
 - 13.1.2. All enclosures and guards must be in place before using the equipment.
 - 13.1.3. Workers shall not, under any circumstances, reach into the infeed hopper of a chipper unless the machine is turned off and locked out.
 - 13.1.4. Towable equipment must be chocked or otherwise secured in place when detached from the vehicle.
 - 13.1.5. Housekeeping is vital around these machines to avoid trip hazards.

14. Trucks and Other Vehicles

- 14.1. The following procedures should be used when operating trucks or other vehicles:
 - 14.1.1. Logs and brush shall be securely loaded onto vehicles. Attention needs to be made to the weight of the vehicle and the load being placed onto it. Overloading a vehicle can cause serious safety hazards. It will increase stopping distance and handling of the vehicle. A second trip or truck should be used to prevent overloading.

14.1.2. Logs and brush shall not overhang the sides or obscure tail lights, brake lights, and vision.

14.1.3. Wood chips should not be left in a truck bed for an extended period of time to avoid spontaneous combustion.

15. All Hand Tools and Portable Power Hand Tools

15.1. The following procedures should be used with all hand tools and portable power hand tools:

15.1.1. Tools shall be used according to manufacturer's operating and safety instructions.

15.1.2. Tools will be maintained in serviceable condition, with handles that are tight-fitting, properly shaped, and free of splinters or sharp edges.

15.1.3. Tools shall be inspected daily before use and adjusted, repaired, or replaced if they are unsafe or damaged.

15.1.4. Tree removal workers shall not carry tools in their hands while climbing, unless they are tools that are used to assist them in their climbing.

15.1.5. Tools other than ropes or throw lines shall not be thrown into a tree, out of a tree, or from tree removal worker to tree removal worker while in a tree—climbing lines or hand lines shall be used to raise or lower tools and equipment.

15.1.6. Corded electric power tools shall not be used in trees or aerial devices near energized electrical conductors where there is a possibility of the power tools or supply cords contacting the conductor.

15.1.7. Pole tools with poles made of metal or other conductive material shall not be used where electrical hazards exist.

15.1.8. All portable electric power tools shall be double insulated.

15.1.9. Tree care workers should prevent extension cords from becoming entangled, damaged, or cut by blades and bits. When working aloft, power tools and supply cords should be supported by a tool lanyard.

16. Gasoline Powered Chain Saws

16.1. The following procedures should be used when operating gasoline powered chain saws:

16.1.1. When carrying a chainsaw, make sure the chain guard or scabbard is on and always walk with the bar pointing behind you

16.1.2. Before beginning work, clear the area of debris and obstructions that might cause you to trip and fall or block your retreat path.

16.1.3. Ensure saw chains are properly adjusted; mufflers, chain breaks and nose shielding devices are in place and operational; and cutting edges are sharp and shaped properly.

16.1.4. Employees must wear appropriate PPE including: hearing, eye and hand and body protection.

16.1.5. When being started, chainsaws shall be held firmly on the ground or otherwise held in a manner that does not allow movement of the saw when pulling the handle and the chain brake shall be engaged.

16.1.6. When a tree care worker is working in a tree or from a bucket of an aerial lift device, drop-starting a chain saw is permissible only after ensuring that the area below is not occupied.

- 16.1.7. The chainsaw shall be held with the thumbs and fingers of both hands encircling the handles during operation unless the employer demonstrates that a greater hazard is posed by keeping both hands on the chain saw in a particular situation.
- 16.1.8. Chainsaws shall be started at least 10 feet from the fueling area.
- 16.1.9. Chain saws shall not be used to cut directly overhead.
- 16.1.10. Because of the many specialized chain saw operations utilized during tree care operations, it must be emphasized that operational exceptions to the provisions of ANSI B175.1-1991 "Safety Requirements for Gasoline Powered Chain Saws" are acceptable and may require a flexible and/or applicability judgment decision for a prescribed operation.

17. Axes, Brush Hooks, Machetes, and Other Chopping Tools

- 17.1. The following procedures should be used when operating axes, brush hooks, machetes, or other chopping tools:
 - 17.1.1. Chopping tools that have loose or cracked heads or splintered handles shall not be used
 - 17.1.2. Chopping tools shall not be used while working aloft.
 - 17.1.3. Chopping tools shall be swung away from the feet, legs, and body, using minimum forces practical for function and control using a secure grip, firm footing, and after ensuring clearance of overhead hazards.
 - 17.1.4. Chopping tools shall not be driven as wedges or used to drive wedges.

18. Wedges, Chisels, and Gouges

- 18.1. The following procedures shall be used when operating wedges, chisels, and gouges:
 - 18.1.1. Wedges and chisels shall be properly pointed and tempered and free of cracks or flaws. Tools with mushroomed heads shall not be used
 - 18.1.2. Eye protection shall be used during impact operations.
 - 18.1.3. Only wood, plastic, or soft-metal wedges shall be used to prevent binding while operating chainsaws.

19. Ropes and Climbing Equipment

- 19.1. The following procedures should be used when operating ropes and climbing equipment:
 - 19.1.1. Type II saddle belts and lanyards as specified in ANSI A10.14 shall be worn when above ground level. Alterations that would compromise the integrity of the saddles or lanyards are not permitted.
 - 19.1.2. Climbing lines shall be identified by the manufacturer as suitable for tree climbing.
 - 19.1.3. Prusik loops, split tails, and work-positioning lanyards used in a climbing system shall meet the minimum strength standards for climbing lines.
 - 19.1.4. Carabineers used in securing the climbing line and/or work-positioning lanyard to the climbing saddle shall be of the self-closing positive-locking type with a minimum tensile strength of 5000 pounds.
 - 19.1.5. Rope snaps used in climbing shall be the self-closing, locking type with a minimum tensile strength of 5000 pounds.

- 19.1.6. Equipment used to secure a tree care worker in the tree or from an aerial lift shall not be used for anything other than its intended purpose, except that climbing line may be used to raise and lower tools.
- 19.1.7. Ropes and climbing equipment shall be stored in such a manner as to prevent damage through contact with sharp tools, cutting edges, gas, oil, or chemicals.
- 19.1.8. Climbing lines shall never be left in trees unattended.

20. Ladders

- 20.1. The following procedures should be used when operating ladders:
 - 20.1.1. Ladders made of conductive material shall not be used where electrical hazards exist.
 - 20.1.2. Cleats, metal points, skid-resistant feet, lashing, or other effective means of securing the ladder shall be used when there is danger of slipping.
 - 20.1.3. Ladders shall be stored under suitable cover, protected from the weather, and kept in a dry location away from excessive heat. While in storage they shall be supported to prevent sagging.

21. Personal Protective Equipment

- 21.1. Personal Protective Equipment (PPE) will be supplied at no cost to employees who perform tree work in accordance with this document and the Facilities Services Employee Manual.
- 21.2. Each employee is responsible for properly maintaining and using the PPE provided. Supervisors are responsible for ensuring that each employee is issued the required PPE, ensuring that they wear the appropriate PPE, and training employees on proper PPE use and care.
- 21.3. Periodic inspections by the employee and their supervisor of all PPE are required to ensure it is in good working order. Any items that are defective or damaged shall be repaired or the unserviceable PPE shall be replaced before work is commenced.
- 21.4. Head Protection
 - 21.4.1. Head protection, in accordance with ANSI Z89.1 shall be worn during all tree work where there is a potential for injury from falling objects or when exposed electrical conductors could contact the head.
 - 21.4.2. To protect employees working below, helmets must have a chin strap when working at higher elevations.
- 21.5. Hearing Protection
 - 21.5.1. The operation of certain power tools and machines over a specified period of time will require the employee to be protected. For example, gas powered chain saws and chippers require hearing protection.
- 21.6. Eye and Face Protection
 - 21.6.1. Eye protection, in accordance with ANSI Z87.1 shall be worn during all phases of tree removal.
 - 21.6.2. A minimum of impact resistant safety glasses with side shields shall be worn at all times to protect against limbs, sticks, splinters, wood chips, saw dust and other flying objects; however, impact resistant goggles are recommended.

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- 21.6.3. When operating a chipper, a full face mask shall be worn. In cases where sun glare causes interference with the employee's vision, lens tinting should be added.
- 21.7. Hand Protection
 - 21.7.1. Leather gloves shall be worn at all times to protect against cuts, punctures, heat and splinters
- 21.8. Body Protection
 - 21.8.1. Loose fitting clothing and jewelry should not be worn when performing tree work.
 - 21.8.2. All loose items should be removed or secured by taping them down. Loose items can become entangled quickly in saws and chippers and can pull the employee into the saw blade or chipper.
 - 21.8.3. Limbs can also snag onto loose items and knock the employee off balance.
 - 21.8.4. Long pants and long sleeves shall be worn to protect the employee from cuts and abrasions.
 - 21.8.5. Chain saw resistant leg protection, such as ballistic nylon chaps, shall be worn when an employee is operating a chain saw on the ground.
 - 21.8.6. Workers who are engaged in operating a chain saw on a ladder, climbing rope or aerial bucket are not required to wear chain saw resistant pants if it interferes with the employee's mobility and safety.
- 21.9. Foot Protection
 - 21.9.1. Employees exposed to impact or compression hazards from objects falling or rolling onto their toes, or weight pressing on their toes shall use protective footwear with toe guards.
 - 21.9.2. When the dorsum of the foot is exposed to impact or compression hazards, the employee shall use metatarsal guards in addition to toe guards. The laces shall be tied at all times and kept short enough to avoid snagging.
 - 21.9.3. The boot also needs to have adequate traction for climbing.
- 22. First-aid Kits (Mandatory). -OSHA 1910.266 App A**
 - 22.1. The following list sets forth the minimally acceptable number and type of first-aid supplies for first-aid kits required under paragraph (d)(2) of the logging standard. The contents of the first-aid kit listed should be adequate for small work sites, consisting of approximately two to three employees. When larger operations or multiple operations are being conducted at the same location, additional first-aid kits should be provided at the work site or additional quantities of supplies should be included in the first-aid kits.
 - 22.1.1. Gauze pads (at least 4 x 4 inches).
 - 22.1.2. Two large gauze pads (at least 8 x 10 inches).
 - 22.1.3. Box adhesive bandages (band-aids).
 - 22.1.4. One package gauze roller bandage at least 2 inches wide.
 - 22.1.5. Two triangular bandages.
 - 22.1.6. Wound cleaning agent such as sealed moistened towelettes.
 - 22.1.7. Scissors.
 - 22.1.8. At least one blanket.
 - 22.1.9. Tweezers.
 - 22.1.10. Adhesive tape.
 - 22.1.11. Latex gloves.
 - 22.1.12. Resuscitation equipment such as resuscitation bag, airway, or pocket mask.
 - 22.1.13. Two elastic wraps.
 - 22.1.14. Splint.
 - 22.1.15. Directions for requesting emergency assistance.