NATE

THE COMMUNICATIONS INFRASTRUCTURE CONTRACTORS ASSOCIATION

NATE Tower Site Hazard Recognition Guide

Disclaimer

NATE is a non-profit trade organization dedicated to facilitating safety, education and standards for the tower erection, service and maintenance industry. In that regard, NATE compiles safety resources available to members to assist them in the development of their safety and health programs.

The *NATE Tower Site Hazard Recognition Guide* consists of information being made available – at no cost – to employees of tower owners, carriers, general contractors, broadcasters and tower erectors as an informational resource for recognizing potential hazards on tower sites. Since hazard recognition is an essential element in tower site safety, NATE is making this information available to anyone involved in the tower industry as an educational resource on how to recognize potential hazards on tower sites.

NATE wishes to confirm that this online information is not intended to be a training course, but rather an informational safety resource for employees and employers on how to recognize potential tower site safety hazards. By reviewing and utilizing this information provided by NATE, you hereby acknowledge and agree that NATE is not and does not assume responsibility or any legal duty to any one person or party, including any liability for the training of employees on tower sites. At all times, employers remain solely responsible for the safety of employees on tower sites, and it is their sole legal obligation and responsibility to comply with all applicable OSHA and state regulations. The use of the resource and the concepts discussed herein is at the user's sole discretion and risk.

Duty to Enforce Safety and Health Compliance

Under the Occupational Safety and Health Act, each employee is required to comply with all applicable OSHA regulations as well as safety and health policies and programs established by the Employer to comply with the law. The employer is required to enforce compliance with the regulations and safety and health policies and, when violations are observed, to correct the violation and utilize appropriate disciplinary action, up to and including termination, to prevent future violations. The employer's failure to enforce compliance can result in civil and criminal liability for the employer.

Getting Started

The following information is provided to help employees of tower owners, carriers, broadcasters, general contractors and tower erectors recognize hazards on tower sites. Recognizing hazards will prevent accidents. Reducing the number of accidents is in the best interest of everyone involved in tower erection, service and maintenance because accidents lead to:

- Delays in the completion of work;
- Reduced quality of work;
- Increased job costs;
- Potential liability and litigation; and, most notably;
- Injuries or fatalities.

Once hazards are identified, the competent person on site should be notified of the potential hazard so that appropriate corrective action can be taken.

The following information is excerpted from Advisory Committee on Construction Safety & Health, ACCSH TOWER ERECTION WORKGROUP – Job Site Best Practices and Safety Audit Issues, Adopted October 18, 2004, and includes comments and additional information to support a better understanding of each individual item.

Color Coded System

The color coded system of this guide is designed as follows:

Black: Headings and topics;

Blue: The Quick Read – a one or two sentence guide to establish the basics of recognizing hazards;

Green: Definitions and/or descriptions of the importance of each element of hazard recognition; and

Red: Talking points and details supporting each subject area.

Hazard Recognition Guide Table of Contents

PART 1

Job Site Documentation

Part One – Table of Contents

A. Job Hazard Analysis

Has a job hazard analysis been conducted for this site?

OSHA provides the definition of a hazard as: "a danger which threatens harm to employees" or "unsafe workplace conditions or practices (dangers) that could cause injuries or illness (harm) to employees." To identify hazards in a workplace, contractors should use a systematic approach. There are various strategies that can be used, depending on the type of work.

Make sure the contractor can demonstrate their process, which should include these basics:

- **Identify** – Look for hazards in materials, equipment, the environment and potential hazards caused by employees.
- **Analyze** – Take a closer look at the hazard to determine its nature and root cause.
- **Develop A Solution** – Once the source has been identified, develop ideas for possible solutions, such as engineering controls to eliminate the hazard by redesigning the equipment, changing the processes or substituting materials. Management controls can address exposure to hazards that engineering controls cannot eliminate by establishing safe work procedures, work schedules, improving training and changing human behavior. Interim controls can be used until a final solution can be implemented.
- **Present Recommendations** – Provide a report to management that gives the information needed to make a decision concerning the hazard(s).
- **Implement the Changes** – Make the changes that management has approved.
- **Evaluate** – Monitor the effectiveness of the changes.

B. Safety Signs

Are appropriate safety signs in place to provide adequate warning of potential hazards?

Generally, signage should be located on each side of the project area within 50 feet of the project boundary.

When approaching the project, note if the safety signs appropriate to the work are placed in obvious locations to warn of the hazards associated with the work. Each site will have particular hazards while work is taking place. The signs should warn of the hazard before it is approached.

C. Competent Person

Is a competent person on site?

OSHA defines a *competent person* in 29 CFR 1926.32(f) as "one who is capable of identifying existing and predictable hazards in the surroundings or working conditions which are unsanitary, hazardous, or dangerous to employees, and who has authorization to take prompt corrective measures to eliminate them." The Competent Person must be identified before work begins.

Competent Person Defined:

The definition has two distinct parts: the first — “capable of identifying existing and predictable hazards in the surroundings or working conditions which are unsanitary, hazardous, or dangerous to employees” — comprises a fairly loose standard that many persons might consider themselves qualified to meet. Common sense would dictate that the competent person must have the knowledge, intelligence, and wherewithal to recognize and identify situations and conditions that put workers at risk. Such competence should also include the ability to predict a hazardous situation. Common sense considerations are necessary but not sufficient to meet OSHA criteria.

D. First Aid/CPR

Can someone on site provide requisite first aid if needed?

Contractors are required to provide first aid and additional certifications determined by the job site's distance from the emergency medical services. Does someone on the crew have these certifications?

OSHA defines "first aid" as any one-time treatment, and any follow-up visit for the purpose of observation of minor scratches, cuts, burns, splinters, or other minor industrial injuries, which do not ordinarily require medical care. This one-time treatment, and follow-up visit for the purpose of observation, is considered first aid even though provided by a physician or registered professional.

If there will not be an employee on site trained to provide first aid, the employer shall arrange for first aid to be available through a third-party provider.

E. Emergency Data Forms

Are emergency data forms available?

Forms are required for reporting details regarding accidents and injuries for OSHA 300 logs and insurance first report claims. Make certain the Supervisor is aware of his/her responsibilities should an accident occur.

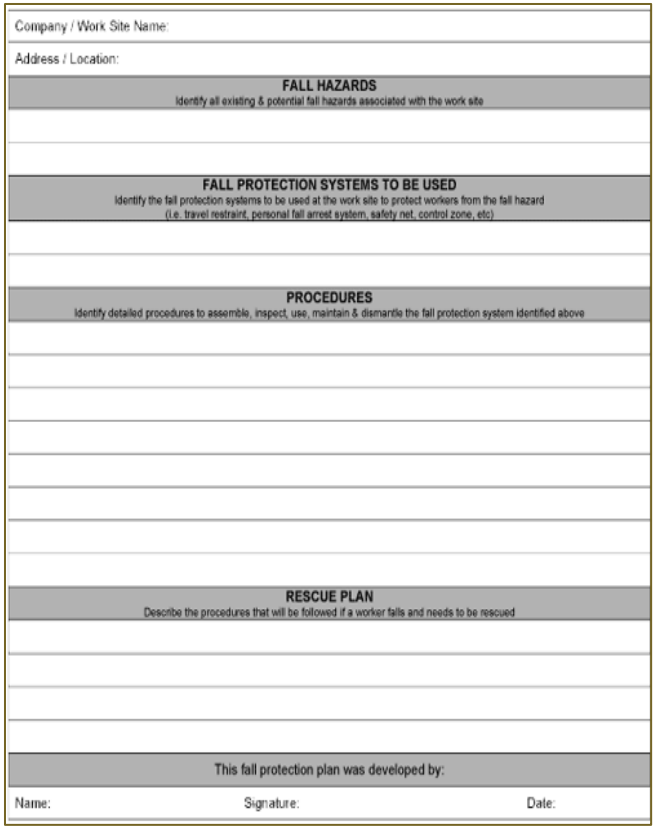
Some companies utilize dial-in services for someone to take the information over the telephone. Make sure the Supervisor has the forms or number available, in case of an emergency.

Necessary information including maps or directions to hospitals and numbers for emergency services should be updated and verified as accurate.

F. Site-Specific Emergency Rescue Plan

Do employees know what steps to take in case of an emergency?

OSHA Regulations state: "The employer shall provide for prompt rescue of employees in the event of a fall or shall assure that employees are able to rescue themselves. This requires a written rescue plan that is applicable for the site-specific conditions. Employers must be prepared to retrieve a fallen worker within minutes."



Company / Work Site Name:

Address / Location:

FALL HAZARDS
Identify all existing & potential fall hazards associated with the work site

FALL PROTECTION SYSTEMS TO BE USED
Identify the fall protection systems to be used at the work site to protect workers from the fall hazard
(i.e. travel restraint, personal fall arrest system, safety net, control zone, etc)

PROCEDURES
Identify detailed procedures to assemble, inspect, use, maintain & dismantle the fall protection system identified above

RESCUE PLAN
Describe the procedures that will be followed if a worker falls and needs to be rescued

This fall protection plan was developed by:

Name: Signature: Date:

For each fall hazard that is controlled by the use of PPE, the crew will have a specific location in mind and will have identified a point for anchoring the fall protection system and taken into consideration the fall clearances required to stop the fall. Rescue procedures build on the knowledge gained from the fall protection procedures for each hazardous location. Rescue procedures then take the next step to determine how best to retrieve an incapacitated worker after fall protection PPE has arrested their fall. Additional considerations that are part of a rescue procedure include:

- Location and strength of a rescue anchor;
- Identification of the nearest safe working level;
- What equipment is required to relocate the fallen worker to a safe working level; and
- Personnel needed to operate the rescue equipment, and means to protect rescue personnel during rescue operations.

G. Overhead Electrical Hazards

Have overhead electrical hazards been identified and practices implemented to maintain appropriate distances?

The hazards associated with overhead electrical lines impact the safety of the crew. OSHA requires an electrical safety plan be established for each project where equipment or work operations may contact or disrupt power lines. Each project is to have a plan that provides for the identification and marking of all electrical lines.

Procedures must be established and followed to ensure that all workers, equipment operators, and truck drivers are fully aware of electrical hazards and take the necessary steps to avoid them. OSHA requires:

- Electrical systems shall be assumed to be energized high voltage until verified otherwise by the utility.
- The contractor shall identify and reference all potential electrical hazards and document such actions.
- Ensure employees are not placed in dangerous proximity to high voltage.
- Dangerous proximity applies to the individual and any conductive object.
- Dangerous proximity is defined as within 3m (10 ft.) for voltages up to 50 kilovolts, and an additional 0.1m – or roughly 4 inches – for every 10 kilovolts over 50 kilovolts.
- Ensure that when any equipment operator is unable to assess clearances, a knowledgeable "spotter" observes for clearance and directs the operator.
- Inform employees of the hazards and corresponding precautions when working near high voltage.

Prior to the start of work where contact with energized electrical systems is possible, the contractor shall identify existing facilities and reference their location to prominent physical features:

- In advance of work, the utility shall be called upon to identify energized facilities, and to determine the need to de-energize, insulate, or otherwise protect the facilities against accidental contact.
- Workers and equipment will not work within 10 feet of energized power lines or equipment.
- No portion of any piece of equipment, any tool or any person is allowed within 10 feet of energized power lines or equipment.
- You cannot move High voltage power lines out of your way without appropriate arrangements with the applicable power company.
- Always consider all high voltage power lines as energized high voltage power lines.
- All equipment capable of coming within dangerous proximity of a high voltage line in the course of its operation shall have a warning sign reading: "*DANGER: UNLAWFUL TO OPERATE ANY PART OF THIS EQUIPMENT WITHIN 10 FEET OF HIGH VOLTAGE LINES*".

If a utility line is contacted or knocked down:

- Keep everyone away from the wire – place guards around the wire to warn others.
- Call the utility immediately.
- Do NOT attempt to move the wire.

If someone contacts an energized wire:

- Do not touch the victim if still in contact with or close proximity to the wire.
- Call the utility immediately.
- Call EMS.
- Administer CPR, if necessary, when the victim is no longer in contact or close proximity or the wire is de-energized.

If wires come in contact with equipment:

- Occupants should remain inside equipment and wait for the utility company to de-energize contacting wires.
- If necessary to leave the equipment, leap with both feet together as far away from the equipment as possible.

H. Safety Data Sheets (SDS)

Are Safety Data Sheets (SDS) readily available for all chemicals with which the crew may come into contact?

OSHA requires contractors to ensure that the hazards of all chemicals produced or imported are evaluated, and that all information concerning their hazards is transmitted to employers and employees.

This information should be transmitted using a comprehensive hazard communication program. The program should include all container labeling and all forms of warning, material safety data sheets and employee training. Contractors should have SDS for any hazardous chemicals on site. They should be available for reference as needed.

Employees must be trained to read and understand SDS.

Job Site Documentation Summary

- Identify and address hazards with a systematic approach.
- Ensure appropriate safety signs are properly placed.
- Identify the competent person before work begins.
- Provide a certified first-aid employee or arrange a third party provider.
- Ensure the supervisor on site is aware of his/her responsibilities in case of emergency, and is provided with an on site accident and injury forms and maps or directions to hospitals.
- Make employees aware of steps to be taken in the event rescue operations are needed.
- Identify overhead electrical hazards and establish and review overhead electrical safety.
- Provide Material Safety Data Sheets on site and ensure employees are trained to read and understand them.

PART 2

Job Site Conditions

Part Two – Table of Contents

A. Housekeeping
B. Material Storage
C. Site Access
D. Barricades
E. Drinking Water
F. Chemical, Flammable and Combustible Liquid Storage
G. Fire Prevention/Protection/Extinguishers
H. Vegetation/Plant/Animal Hazards

A. Housekeeping

Is the site orderly and clear of debris?

Debris on a job site can be hazardous in numerous ways, from creating tripping hazards to the combustible nature of substances. OSHA requires employers to be aware of and keep work sites free of such potential hazards.

Contractors should have job site protocol in place to address the following issues as outlined in CFR 1926.25:

- During construction, alteration and repairs, work areas shall be kept clear from debris;
- Combustible scrap and debris shall be removed at regular intervals. A safe means shall be provided to facilitate such removal; and
- Containers shall be provided for the collection and separation of waste, trash, oily and used rags, and other refuse. Containers used for garbage and other oily, flammable or hazardous wastes, such as caustics, acids, harmful dust, etc., shall be equipped with covers. Garbage and other waste shall be disposed at frequent and regular intervals.

B. Material Storage

Are materials stored in an orderly manner in an appropriate area on site?

Material stored on site can impact safety through the creation of tripping hazards as well being struck by or caught in between improperly stored materials. Any flammable or caustic items in storage pose their own health and safety dangers.

OSHA requires under 29 CFR 1926.251 that areas used for storage be kept free of accumulation of materials that constitute hazards from tripping, fire, explosion or pest harborage. Vegetation control will be exercised when necessary.

C. Site Access

Have steps been taken to prevent unauthorized access to the site?

Unauthorized access to a job site can create hazards to employees, and to those who do not belong on site.

Measures shall be taken to prevent site access by unauthorized personnel and vehicular traffic, including posting signage and preventing entry with appropriate boundary markers, such as:

- caution tape;
- traffic cones;
- locking doors and gates; and
- other measures to control access as needed.

These and other measures shall be considered depending on the proximity and likelihood of intrusion by unauthorized personnel.

D. Barricades

Are barricades being used on site as necessary?

Barricades are used to obstruct, deter, or control the passage of persons or vehicles on a job site as necessary to maintain a safe work environment.

These and other measures shall be considered, depending on the proximity and likelihood of intrusion by unauthorized personnel.

E. Drinking Water

Is there a source of potable drinking water on site?

Access to drinking water is essential to employee health. OSHA requires that an adequate supply of potable water shall be provided in all places of employment.

Portable containers used in dispensing drinking water shall be capable of being tightly closed and equipped with a tap. Water shall not be dipped from containers according to 29 CFR 1926.51. Any container used for distributing drinking water shall be clearly marked as to the nature of its contents and not used for any other purposes.

F. Chemical, Flammable and Combustible Liquid Storage

Are chemical, flammable and combustible liquids stored in appropriate containers?

The presence of chemical, flammable or combustible liquids increases the possibility of fire. Employees should be aware of the steps to take to safely store these substances.

29 CFR 1926.152 requires the following steps be taken when storing chemical, flammable or combustible liquids:

- Only approved containers and portable tanks shall be used for storage and handling of flammable and combustible liquids;
- Flammable liquids shall be kept in closed containers when not actually in use;
- Leakage or spillage of flammable or combustible liquids shall be disposed of promptly and safely; and
- Flammable liquids may be used only where there are not flames, or other sources of ignition within 50 feet of the operation, unless conditions warrant greater clearance.

G. Fire Prevention/Protection/Extinguishers

Is a fire extinguisher of sufficient size and grade present on site?

To ensure employee safety, OSHA requires employers to develop a fire protection program to be followed throughout all phases of construction or demolition and provide appropriate firefighting equipment.

OSHA requires the following steps be taken for fire protection and prevention:

- When working in an area where there is a possible fire hazard, there will be a written fire prevention and protection program in place;
- Access to firefighting equipment shall be maintained at all times;
- Firefighting equipment shall be conspicuously located;
- Firefighting equipment shall be periodically inspected; and
- No less than one 2a fire extinguisher shall be on site at all times.

H. Vegetation/Plant/Animal Hazards

Have steps been taken to identify and deal with organic hazards on the job site?

Potential organic hazards vary according to geographic locations. Steps should be taken to ensure employee health and safety under these changing conditions.

Plants such as poison oak, sumac, ivy and bushes with heavy thorns and other dangers of skin irritation or puncture shall be noted in the pre-job hazard survey and shall be noted and addressed prior to the commencement of work.

Based on geographic location, potential for injury from wild animals and insects shall be noted in the pre-job hazard survey and shall be discussed with steps taken to respond to any threat prior to the commencement of work.

As noted CFR 1926.604(a)(1), employees engaged in site clearing shall be protected from hazards of irritant and toxic plants and suitably instructed in the first-aid treatment available.

Job Site Conditions Summary

- Keep sites free of hazardous debris.
- Store materials in an orderly manner to prevent hazards.
- Post signage to prevent unauthorized access.
- Use barricades as needed to maintain a safe work environment.
- Provide potable drinking water on site.
- Store chemicals and liquids in appropriate containers.
- Develop fire protection program with no less than one 2a extinguisher on site.
- Identify and address any organic hazards on site, such as plant, animal, and vegetation.

PART 3

Personal Protection Equipment (PPE)

Part Three – Table of Contents

A. Head Protection

Is everyone on site wearing a hard hat?

Everyone on a tower site should be wearing a hard hat when the possibility of injury from falling objects, flying objects, electric shock and other job sites hazards are present. Federal standards exist requiring when hard hats be used, and specifying which hard hats are approved for what types of job situations.

Head Protection

29 CFR 1926.100 requires employees working in areas where there is a possible danger of head injury from impact, falling or flying objects, or from electrical shock and burns, wear hard hats.

Helmets for employee protection against impact and penetration of falling and flying objects shall meet the specifications contained in ANSI standard Z89.1-2003 (or most current revision). Helmets to protect employees exposed to high voltage electrical shock and burns shall meet the specification contained in ANSI Z89.2-2003 (or most current revision).

Hard hats shall be kept clean and regularly inspected. Hard hats that are found to be defective shall be replaced.

B. Footwear

Are all workers wearing work boots?

Appropriate footwear is essential for workers on tower sites when the potential exists for hazards caused by falling or rolling objects, or objects piercing the sole, or the possibility of electrical hazards. Proper footwear on tower sites also protects employee's feet from physical/skeletal injuries resulting from climbing and working on towers and related structures.

Protective footwear that meets the ANSI Standards for compression, impact, electrical and slip resistance shall be worn at all times while on the work site.

Work boots are needed for the protection for those employees who are exposed to foot hazards and should:

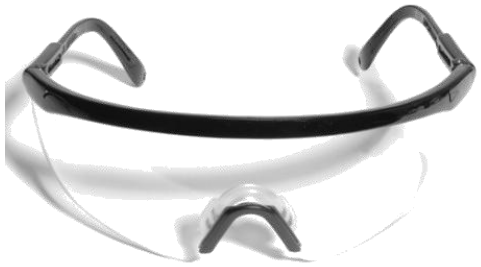
- Have puncture resistant soles to restrict objects from puncturing the sole and entering the foot;
- Support the boot from being squeezed in a pinch point;
- Have leather uppers that are a minimum of 6 inches above the heel for ankle protection; and
- Shall have a leather instep covering to protect the instep and toes from small items that may bruise the employee's feet.

29 CFR 1910.136 requires the use of work boots meeting ANSI Z41-1991, or boots that shall be demonstrated by the employer to be equally protective. Safety-toe work boots need to be worn where there is a danger of foot injuries.

C. Eye Protection

Do circumstances warrant eye protection and if so, has it been provided?

When machines or operations present potential eye or face injury from physical, chemical or radiation agents, proper eye and face protection shall be used.



29 CFR 1926.102 mandates that employees be provided with appropriate eye and face protection under the circumstances mentioned previously. The protective devices must meet the standards of ANSI Z87.1-1989 (or most current revision) or be at least as effective as this standard requires.

Eye protection equipment shall be worn on jobs:

- In all designated eye protection areas;
- On all jobs where it has been specified that eye protection is required; and
- In any situation where there is a danger of flying objects.

Employees whose vision requires them to use corrective lenses shall be protected by goggles that fit over those lenses, or use goggles that incorporate the corrective lenses.

Face and eye protection shall be kept clean and in good repair. Sunglasses that are not properly approved safety devices are not to be used on the work site.

D. Hand Protection

Are tower climbers wearing hand protection when appropriate to the task being completed?

Employers are mandated to require their employees to wear hand protection when circumstances pose hazards to exposed hands.

29 CFR 1910.138 requires that employers require their employees to wear hand protection when employees' hands are exposed to hazards such as harmful substances, cuts or lacerations, severe abrasions, punctures, chemical burns, thermal burns and harmful temperature extremes.

Employers shall base the selection of hand protection on an evaluation of the performance characteristics of the hand protection relative to the tasks to be performed, conditions present, duration of use and the hazards and potential hazards identified.

E. Work Clothing

Are employees wearing clothing appropriate to the task at hand and the prevailing conditions?

Clothing provides employees with protection against potential hazards, both natural and man-made. While the Code of Federal Regulations does not mandate clothing choices for tower workers, clothing appropriate to the circumstances at hand should be worn.

F. Hearing Protection

If required by circumstances, are employees using hearing protection?

If noise levels exceed recognized standards and reduction of noise levels is infeasible, employers are required to provide hearing protection. Under these circumstances the use of hearing protection is mandatory.

OSHA requires the use of hearing protection under those circumstances where exposure to noise exceeding the levels established in 29 CFR 1926.101 table D-2 cannot feasibly be reduced.

OSHA further requires that ear protective devices inserted in the ear shall be fitted or determined individually by competent persons. Plain cotton is not an acceptable protective device.

Personal Protective Equipment (PPE) Summary

- Ensure all personnel are wearing the required protective gear.
- PPE includes but is not limited to hard hat, footwear, eye protection, hand protection, appropriate clothing and hearing protection if needed.

PART 4

Fall Protection Equipment

Part Four – Table of Contents

A. 100% Fall Protection
B. Proper Equipment on the Site
C. Fall Protection Equipment Inspection
D. Documented Employee Training
E. Fall Protection Equipment Tags

A. 100% Fall Protection

Is 100% fall protection being used?

Prior to employees being exposed to elevations above 6 feet, the employer shall ensure that 100% fall protection systems compatible with the tasks assigned are provided, used, and maintained. The proper equipment or systems for providing 100% fall protection are outlined in section B.

29 CFR 1926.500 – Subpart M – is utilized by OSHA as the source for rules regarding the development of fall protection systems for workers performing duties at heights. The broadcast and communications tower industry is exempt, however, from certain elements of Subpart M, as defined in 29 CFR 1926.500(a)(3)(iv): which states, "Section 1926.502 does not apply to the erection of tanks and communication and broadcast towers."

Even though tower erectors are exempt from subsection 502 of Subpart M, OSHA instructs that the value of Subpart M as a resource for effective fall protection systems remains valid. OSHA recommends that tower erectors utilize Subpart M as a source for designing fall protection systems.

It should be pointed out that the definitive source of recognized best practices for fall protection criteria and practices can be found in the ANSI Z359 group of standards and ANSI A10.32 standards.

B. Proper Equipment on the Site

Is the proper fall protection equipment on the site?

Each employer needs to provide equipment designed and tested to help reduce the possibility of injury in the event of a fall and provide a program describing procedures for its use.

Fall protection equipment includes full body harnesses, positioning and fall arrest lanyards and more. Employers are required to provide necessary fall protection equipment or systems to protect workers working at heights of six feet or greater.

Fall Protection Requirements

29 CFR 1926.502 (a)(2) states that employers shall provide and install all fall protection systems required by this subpart for an employee, and shall comply with all other pertinent requirements of this subpart before that employee begins the work that necessitates the fall protection.

Fall protection systems are divided into two categories: Fall Prevention and Fall Arrest. Fall Prevention systems are designed to ensure falls from heights will not be experienced by any employee. Fall Arrest systems are designed to safely stop a fall that has already occurred.

Fall Prevention Systems

In general, Fall Prevention Systems are not feasible while employees are engaged in work on towers. These systems require either the installation of a temporary but sturdy guardrail structure, or an area that the employees can resort to which has no fall hazards. However, these systems would be practical for some rooftop work situations. (Please refer to NATE's publication *Suggested Fall Protection – Rooftop Work Area Protocol*.)

Details regarding fall prevention systems can be found in 29 CFR 1926.502(b), and also in 1926 Subpart M appendix B.

Fall Arrest and Positioning Systems

Fall Arrest Systems are the most feasible methods of fall protection for vertically mobile work such as tower work. Lifeline systems, shock-absorbing lanyards, fixed ladder safety device systems and safety nets are all examples of fall arrest systems. Positioning systems may prevent falls, but they also allow for short falls, so they will be described in this section. Safety nets are considered a fall arrest system, but they are not feasible for tower work because their size and the rules for their use make them impractical. Since they may be used in some limited applications, or they may be encountered as installed by others, a brief explanation is given.

CAUTION! Fall arrest and position equipment must not be used by anyone who has not read, understood and followed all the instructions and procedures provided by the equipment manufacturer. Failure to observe these instruction and inspection procedures could lead to serious injury or death.

Personal Fall Arrest Systems

The most commonly used and most practical system for tower work is the Personal Fall Arrest System (PFAS). Most towers and similar structures are best accessed using some form of PFAS. Every PFAS consists of 3 components:

- Anchorage
- Body Harness
- Connection Device

The type of Personal Fall Arrest System selected should match the particular work situation, and any possible free fall distance should be kept to a minimum. Consideration should be given to the particular work environment. For example, the presence of acids, dirt, moisture, oil, grease, etc., and their effect on the system, should be evaluated. Hot or cold environments may also have an adverse effect on the system. Wire rope should not be used where an electrical hazard is anticipated. The employer must plan to have means available to promptly rescue an employee should a fall occur, since the suspended employee may not be able to reach a work level independently.

All PFAS equipment, including slings and connectors, shall be dedicated for use only as part of an employee's PFAS or positioning device system and shall not be used for hoisting or handling of materials or any other purpose.

A PFAS, when stopping a fall, shall:

- Limit maximum arresting force on an employee to 1,800 pounds when used with a body harness;
- Be rigged such that an employee can neither free fall more than 6 feet, nor contact any lower level;
- Bring an employee to a complete stop and limit maximum deceleration distance an employee travels to 3.5 feet; and
- Have sufficient strength to withstand twice the potential impact energy of an employee free-falling a distance of 6 feet, or the free fall distance permitted by the system, whichever is less.

NOTE: If the PFAS meets the criteria and protocols contained in Subpart M, and if the system is being used by an employee having a combined person and tool weight of less than 310 pounds, the system will be considered to be in compliance. If the system is used by an employee having a combined tool and body weight of 310 pounds or more, then the employer must appropriately modify the criteria and protocols of subpart M to provide proper protection for such heavier weights, or the system will not be in compliance.

A PFAS and its components subjected to impact loading shall be immediately removed from service and shall not be used again for employee protection until inspected and determined by a competent person to be undamaged and suitable for reuse.

Prior to each use, the PFAS shall be inspected for wear, damage and other deterioration, and defective components shall be removed from service.

A PFAS shall not be attached to guardrail systems, nor shall they be attached to hoists except as specified in OSHA Instruction, Directive No. CPL 2-01-056 (Compliance Guidelines for Fall Protection and Employee Access by Hoist During Communication Tower Construction Activities).

Anchorage

Anchorages used for attachment of a PFAS shall be independent of any anchorage being used to support or suspend platforms and capable of supporting at least 5,000 pounds per employee attached; or, under the supervision of a qualified person, anchorages shall be designed, installed, and used as part of a complete PFAS, which maintains a safety factor of at least two.

Body Harness

A body harness consists of straps which may be secured about the employee in a manner that will distribute the fall arrest forces over at least the thighs, pelvis, waist, chest and shoulders with means for attaching it to the other components of a PFAS.

Straps (webbing) used in strength components of body harnesses shall be made from synthetic fibers.

Connectors shall be drop forged, pressed or formed steel, or made of equivalent materials and shall have a corrosion-resistant finish. All surfaces and edges shall be smooth to prevent damage to interfacing parts of the system.

D-rings shall have a minimum tensile strength of 5,000 pounds and shall be proof-tested to a minimum tensile load of 3,600 pounds without cracking, breaking, or taking permanent deformation.

The attachment point of the body harness shall be located in the center of the wearer's back near shoulder level.

Body harnesses and components shall be used only for employee protection, as part of a PFAS or positioning device system.

D-Rings, Snap-hooks and Carabiners:

- Shall be drop forged, pressed or formed steel, or made of equivalent materials and shall have a corrosion-resistant finish, and all surfaces and edges shall be smooth to prevent damage to interfacing parts of the system;

- Shall have a minimum tensile strength of 5,000 pounds and shall be proof-tested to a minimum tensile load of 3,600 pounds without cracking, breaking, or taking permanent deformation; and

- Shall be a locking type designed and used to prevent disengagement of the snap-hook or carabiner by the contact of the snap-hook keeper or carabiner gate by the connected member. Only locking type snap-hooks and carabiners shall be used.

Unless the snap-hook is a locking type and designed for the following connections, snap-hooks shall not be engaged:

- Directly to webbing, rope or wire rope;
- To each other;
- To a D-ring to which another snap-hook or other connector is attached;
- To a horizontal lifeline; or
- To any object which is incompatibly shaped or dimensioned in relation to the snap-hook such that unintentional disengagement could occur by the connected object being able to depress the snap-hook keeper and release itself.

NOTE: OSHA considers a hook to be compatible when the diameter of the D-ring to which the snap-hook is attached is greater than the inside length of the snap-hook when measured from the bottom (hinged end) of the snap-hook keeper to the inside curve of the top of the snap-hook. Thus, no matter how the D-ring is positioned or moved (rolls) with the snap-hook attached, the D-ring cannot touch the outside of the keeper, thus depressing it open. ***As of January 1, 1998, the use of non-locking snap-hooks is prohibited.***

Lanyards and Lifelines

Ropes and straps (webbing) used in lanyards and lifelines shall be made from synthetic fibers. Lanyards, vertical lifelines and all necessary slings and connectors shall have a minimum breaking strength of 5,000 pounds. Lifelines shall be protected against being cut or abraded.

Tie-off using a knot in a rope lanyard or lifeline (at any location) can reduce the lifeline or lanyard strength by 50 percent or more. Therefore, a stronger lanyard or lifeline should be used to compensate for the weakening effect of the knot, or the lanyard length should be reduced (or the tie-off location raised) to minimize free fall distance, or the lanyard or lifeline should be replaced by one which has an appropriately incorporated connector to eliminate the need for a knot.

Lanyards and Lifelines (Cont.)

Rope grabs will be capable of supporting 5,000 pounds and will be matched with the proper strength and diameter of lifeline.

A shock-absorbing lanyard of no more than 3 feet shall be used to connect the body harness to a floating rope grab so that the free fall distance will be limited to 6 feet.

When vertical lifelines are used, each employee shall be attached to a separate lifeline.

On suspended scaffolds or similar work platforms with horizontal lifelines, which may become vertical lifelines, the devices used to connect to a horizontal lifeline shall be capable of locking in both directions on the lifeline.

Horizontal lifelines shall be designed, installed, and used, under the supervision of a qualified person, as part of a complete personal fall arrest system, which maintains a safety factor of at least two.

Self-Retracting Lifelines (SRL)

SRL's and lanyards which automatically limit free fall distance to 2 feet or less shall be capable of sustaining a minimum tensile load of 3,000 pounds applied to the device with the lifeline or lanyard in the fully extended position.

SRL's and lanyards which do not limit free fall distance to 2 feet or less, shall be capable of sustaining a minimum tensile load of 5,000 pounds applied to the device with the lifeline or lanyard in the fully extended position.

All slings and connectors needed to connect the SRL to the anchorage shall have a minimum breaking strength of 5,000 pounds.

Deceleration Devices

Deceleration devices shall be capable of sustaining a minimum tensile load of 5,000 pounds applied to the device with the lifeline or lanyard in the fully extended position. All necessary slings and connectors needed to connect the deceleration device to the anchorage shall have a minimum breaking strength of 5,000 pounds.

Deceleration devices shall:

- Limit maximum arresting force on an employee to 1,800 pounds when used with a body harness;
- Be rigged such that an employee can neither free fall more than 6 feet, nor contact any lower level;
- Bring an employee to a complete stop and limit maximum deceleration distance an employee travels to 3.5 feet; and
- Have sufficient strength to withstand twice the potential impact energy of an employee free-falling a distance of 6 feet, or the free fall distance permitted by the system, whichever is less.

Ladder Safety Device Systems

[Refer to 29 CFR 1926.1053(a), 1910.21(e)]

A ladder safety device is any device, other than a cage or well, designed to eliminate or reduce the possibility of accidental falls on a fixed ladder. A method of safeguarding an employee while climbing a ladder must be incorporated where the total length of a climbing ladder equals or exceeds 24 feet. The ladder safety device is the most common method and consists of a rigid rail or flexible cable (carrier) that runs along the entire length of the ladder, and a friction or locking device that connects between the carrier and the employee's body harness. In the event of a fall, the device will lock down on the carrier and stop the fall.

Ladder safety devices, and related support systems, shall conform to the following:

- They shall be capable of withstanding, without failure, a drop test consisting of an 18-inch drop of a 500-pound weight;
- They shall permit the employee using the device to ascend or descend without continually having to hold, push, or pull any part of the device, leaving both hands free for climbing;
- They shall be activated within 2 feet after a fall occurs, and limit the descending velocity of an employee to 7 feet/sec. or less; and
- The connection between the carrier and the point of attachment to the body harness shall not exceed 9 inches in length.

The mounting of ladder safety devices for fixed ladders shall conform to the following:

- Mountings for rigid carriers shall be attached at each end of the carrier, with intermediate mountings, as necessary, spaced along the entire length of the carrier, to provide the strength necessary to stop employees' falls;
- Mountings for flexible carriers shall be attached at each end of the carrier. When the system is exposed to wind, cable guides for flexible carriers shall be installed at a minimum spacing of 25 feet and maximum spacing of 40 feet along the entire length of the carrier, to prevent wind damage to the system; and
- The design and installation of mountings and cable guides shall not reduce the design strength of the ladder.

Positioning Device Systems

(Refer to 29 CFR 1926.502(e), see also: 1926 Subpart M appendix D)

Positioning devices shall be rigged such that an employee cannot free fall more than 2 feet and shall be secured to an anchorage capable of supporting at least twice the potential impact load of an employee's fall or 3,000 pounds, whichever is greater.

Ropes and straps (webbing) used in lanyards shall be made from synthetic fibers.

Connectors shall be drop forged, pressed or formed steel, or made of equivalent materials and shall have a corrosion-resistant finish, and all surfaces and edges shall be smooth to prevent damage to interfacing parts of the system.

D-rings and snap-hooks shall have a minimum tensile strength of 5,000 pounds and shall be proof-tested to a minimum tensile load of 3,600 pounds without cracking, breaking, or taking permanent deformation.

Snap-hooks shall be a locking type designed and used to prevent disengagement of the snap-hook by the contact of the snap-hook keeper by the connected member. Only locking type snap-hooks shall be used.

Rappelling and Suspended Positioning

[Refer to 1926.451(g)(1)(i)]

Anchorages used to support suspended positioning or rappelling rigs shall be independent of any anchorage being used for attachment of a PFAS and shall be capable of supporting at least 5,000 pounds per employee attached.

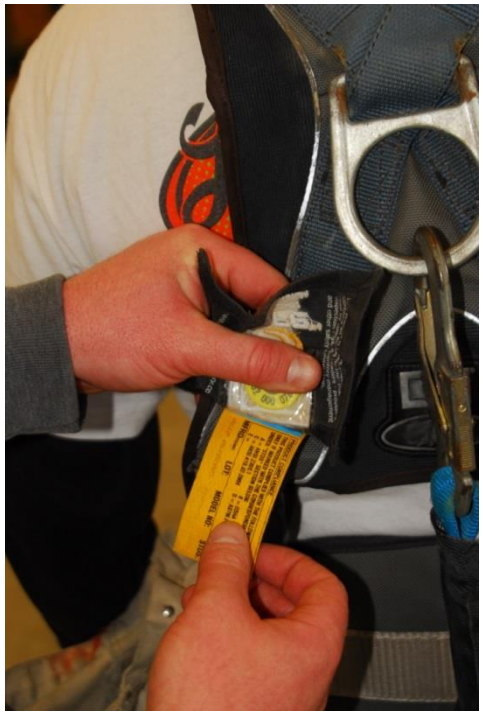
Ropes and straps (webbing) used in suspension and rappelling rigs shall be made from synthetic fibers. Suspension and rappelling lines or systems and all necessary slings, connectors and friction devices shall have a minimum breaking strength of 5,000 pounds. All lines shall be protected against being cut or abraded.

Each employee on a suspended positioning or rappelling rig shall be protected by a PFAS.

C. Fall Protection Equipment Inspection

Is fall protection equipment being inspected daily and documented?

A competent person shall ensure that all fall protection equipment is inspected for wear, damage, defect, or other deterioration prior to each use. Defective equipment shall be identified and tagged as defective and immediately removed from service.



29 CFR 1926(d)(21) states that prior to each use fall arrest systems shall be inspected for wear, damage and other deterioration and defective components shall be removed from service.

Some examples of such defects are:

- Cuts, tears, abrasions, mold or undue stretching;
- Alterations or additions which might affect its efficiency;
- Damage due to deterioration; contact with fire, acids, or other corrosives;
- Distorted hooks, D-rings or faulty closures or locking devices;
- Tongues unfitted to the shoulder or buckles;
- Loose or damaged mountings;
- Non-functioning parts; or
- Wearing or internal deterioration in the ropes.

Again, defective equipment shall be tagged or marked as unusable, or destroyed.

A PFAS and its components subjected to impact loading shall be immediately removed from service and shall not be used again for employee protection until inspected and determined by a competent person to be undamaged for suitable reuse.

NOTE: There is a presumption that it is feasible and will not create a greater hazard to implement at least one of the previously listed fall protection systems. Accordingly, the employer has the burden of establishing that it is appropriate to implement a fall protection plan which complies with 1926.502(k) for a particular workplace situation, in lieu of implementing any of those systems.

D. Documented Employee Training

Do employees who are exposed to falls have documented training?

Details regarding employee training requirements can be found in section 5 of this guide. For this section, it is important to note that documented training of tower climbers must be maintained by the employer for all current employees.

Employers must prepare a written certification that identifies the employee trained and the date of the training. The employer or trainer must sign the certification record. Retraining also must be provided when necessary.

The employer shall document that each employee has been trained with a certification record that includes all of the following:

Certification of Training

29 CFR 1926.503 requires that the employer shall verify compliance with training requirements by preparing a written certification record. The written certification record shall contain the following:

- The name or other identity of the employee trained;
- The dates(s) of the training; and
- The signature of the person who conducted the training or the signatures of the employer.

If the employer relies on training conducted by another employer or completed prior to the effective date of this program, the certification record shall indicate the date the employer determined the prior training was adequate rather than the date of actual training.

The latest training certification shall be maintained.

E. Fall Protection Equipment Tags

Every harness must have a legible tag identifying the harness, model, date of manufacture, name of manufacturer, limitations and warnings.

Check tag for date of manufacture and remove from service if past adopted service life policy. If tagging system is missing or not legible, remove harness from service.

Fall Protection Equipment Summary

- Ensure 100% fall protection systems compatible with the task at hand are being used.
- Appropriate fall protection equipment must be provided, used and maintained.
- A competent person shall inspect all fall protection equipment prior to use, immediately removing from service any equipment identified as defective.
- Prepare written certification that identifies employee fall protection training and date of training.
- Check fall protection equipment for legible tags of service and remove any harness from service if the tag is missing, illegible or the date on the tag has passed.

PART 5

Training

NOTE: To bring consistency to tower climber training NATE developed the Tower Climber Fall Protection Training Standard or NATE CTS. All workers should be trained to the appropriate level of the NATE CTS and to the requisite requirements for the particular job at hand.

Part Five – Table of Contents

A. Tower Climber Fall Protection Training

B. New Hire Fall Protection

C. Company's Safety & Health Program

D. Rigging Training

A. Tower Climber Fall Protection Training

Have all employees working at heights received proper training?

Training is a mandatory and integral part of this program. Training must address fall hazards, what equipment is best suited for each application, the limitations of the equipment, proper use of the equipment and the dynamic forces that could apply to such equipment and personnel in the event of a fall.

Employers must prepare a written certification that identifies the employee trained and the date of the training. The employer or trainer must sign the certification record. Retraining also must be provided when necessary.

Required Training

29 CFR 1926.503 requires an employer to provide a training program for each employee who might be exposed to fall hazards. The program shall enable each employee to recognize the hazards of falling and shall train each employee in the procedures to be followed in order to minimize these hazards.

29 CFR 1926.503 further requires that employees shall be trained, as necessary, by a competent person qualified in the following areas:

- The nature of fall hazards in the work area;
- The correct procedures for erecting maintaining, disassembling, and inspecting the fall protection systems to be used;
- The use and operation of guardrail systems, personal fall arrest systems, safety net systems, warning line systems, safety monitoring systems, controlled access zones, and other protection to be used;
- The role of each employee in the safety monitoring system when this system is used;
- The procedures for the handling and storage of equipment and materials and the erection of overhead protection;
- The role of employees in fall protection plans; and
- OSHA regulations.

Retraining

When the employer has reason to believe that any affected employee who has already been trained does not have the understanding and skill required by this program, the employer shall retrain each such employee.

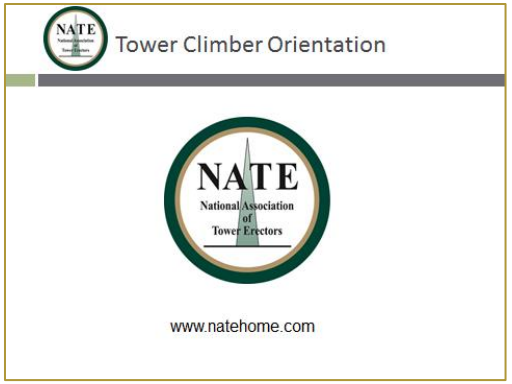
Some circumstances where retraining is required include:

- Changes in the workplace render previous training obsolete;
- Changes in the types of fall protection systems or equipment to be used render previous training obsolete;
- Inadequacies in an affected employee's knowledge or use of fall protection systems or equipment indicate that the employee has not retained the requisite understanding or skill; or
- Re-certification of rescue skills.

B. New Hire Fall Protection

Have new employees been provided with equipment and given the proper orientation and, if applicable, training?

New hires who will be ascending, descending or performing work on an elevated surface or structure who could be exposed to a fall of over six feet, or employees who will be working with people who could be exposed to such falls should receive new hire orientation training. NATE has developed the *Tower Climber Orientation* guide to help address these criteria.



To be ready for work at a new company, the newly hired employee should:

- Review the company safety program, field policy and exam and complete the exam with a passing grade of at least 75%;
- Review all incorrect or unanswered questions with management to ensure complete understanding of the topic(s) in question;
- Complete the NATE Authorized Climber Standard training provided either in-house or by the commercial tower climber safety company selected by the employer;
- Be issued fall protection gear and sign a form describing the equipment they have received;
- An authorized climber shall have a minimum of eight hours of classroom training prior to being exposed to fall hazards in the work place. “Classroom” is defined as “A location that is conducive for the student to comprehend and retain the material presented.” The initial training at minimum must ensure that the employee has had the opportunity to use the equipment in a safe environment. Furthermore, the equipment should be like or similar to the equipment the employee will utilize in his/her workplace. After this initial training the employee must work under the supervision of a competent climber or competent rescuer in the workplace.

C. Company's Safety & Health Program

Do employees understand and are they ready to adhere to the requirements of the company Safety & Health Program?

Employers are required to have a Safety & Health Program for their employees. Employees should sign a document stating that they have reviewed the company Safety & Health Program, and that they agree to abide by the established procedures and assist others in doing the same.

A Safety & Health Program must state that the employer will discipline employees who do not follow the company's Safety & Health Program.

The NATE Accident Prevention, Safety & Health Program Guide is the benchmark for the tower erection, service and maintenance industry. No tower service company should be working on a tower site without a Safety and Health Program that meets, as a minimum, the requirements defined in the NATE publication.

These minimum requirements include information regarding the following:

- Safety Policy Statement;
- Hazard Identification;
- Recordkeeping;
- Education and Training;
- Inspection Policy;
- Safety Audit;
- Accident Investigation;
- Alcohol/Drug Policy;
- Respiratory Protection;
- Fall Protection;
- Authorized Climber Standard and Evaluation;
- Personnel Hoisting Regulations;
- Hazard Communication/SDS;
- RF Exposure;
- Emergency Response; and
- Employer/Employee Relations.

D. Rigging Training

Have the tower workers responsible for rigging received appropriate rigging training?

An improperly rigged tower can have disastrous consequences for both personnel and equipment. Knowledge and understanding of rigging principles, practices and techniques is essential to the success of virtually all operations on towers.

Depending on the circumstances of the particular job, riggers should be trained and understand the following components of rigging:

- Knots, including:
  - Triple sliding hitch;
  - Rolling hitch;
  - Reef or square knot;
  - Figure eight;
  - Clove hitch;
  - Bowline on the Bight;
  - Bowline knot;
- An understanding of tension and compression
- Knots and edges – capacity reductions;
- Rope care & maintenance;
- Static Kernmantle rope;
- Double braided rope;
- Identifying rope damage; and
- 3 Strand rope inspection.

Riggers should also be trained to understand formulas for determining safe working loads, including multipliers for three strand rope.

Wire Rope, Slings and Block Training

Rope material types create additional needs for education as to their proper application and related strengths and weaknesses. Riggers should understand these issues, related factors of safety, and how they apply to the use of the following types of rope:

- Manila or Sisal;
- Polypropylene;
- Nylon;
- Double Braid; or
- Static Kernmantle.

Wire Rope

The following should be understood regarding rigging with wire rope:

- Types and properties of wire rope, their applications and inspections techniques;
- Core slippage in non-rotating wire rope;
- Proper measuring technique;
- Seizing wire rope;
- Lubrication;
- Formulas for safety factors;
- Lay length;
- Replacement criteria;
- Broken end connections, wear and abrasion; and
- Recognizing damage.

Slings

Riggers should understand how slings are made, their applications, and how to determine safe load limits. They should also understand the distinctions between wire rope and synthetic slings and the application of information regarding sling angles and how they affect load capacity.

Blocks

Riggers should understand the varying types of blocks and their proper use and application, along with the following:

- Inspection techniques;
- Matching rope size to sheave grooves;
- Identifying wear and damage;
- Sheave friction;
- Strength and efficiency of sheave usage;
- Block loading factors; and
- Anchorage loading.

Additional Rigging Equipment

Riggers should also be familiar with the following equipment including applications, proper use, and capacity and inspection techniques for:

- Hooks;
- Shackles;
- Eye Bolts;
- Carabiners;
- Alloy Steel Chains;
- End Connections;
- Wedge Sockets and their potential problems; and
- Capstan Hoists.

Training Summary

- Training is mandatory.
- Prepare written certification to document proper training.
- Require training to address fall hazards, proper equipment and equipment limitations.
- Provide new hires with proper equipment during orientation training.
- Request employees to sign document to abide by the company's Safety and Health Program.
- Provide and document proper tower rigging training.

PART 6

Radio Frequency Energy (RF)

Part Six – Table of Contents

A. RF Hazard Consideration
B. RF Exposures

A. RF Hazard Consideration

Are proper precautions against over-exposure to radio frequency energy (RF) in place?

Broadcast and telecommunications antennas emit non-ionizing radiation, or radio frequency energy, commonly referred to as "RF". Exposure limits have been established by the federal government. Employers are required to take steps prior to exposing employees to RF to ensure they will not be exposed to RF beyond established limits.

The Federal Communications Commission (FCC) has established Maximum Personal Exposure (MPE) limits for employees who are exposed to RF. MPE limits are established at 10 to 50 times more sensitive levels than what would cause tissue heating in the human body. Before beginning a job where RF exposure is known to be a possibility, employers shall conduct a site safety plan which shall include methods of ensuring employees are not subjected to RF in excess of established limits.

B. RF Exposures

Have steps been taken to prevent over-exposure to RF?

RF over-exposure can be a hazard to both people and equipment. Tower hands that are over-exposed to RF energy can experience tissue heating. Direct contact with an RF source on the tower can result in a burn. Wire rope on a hoist or crane hanging in the vicinity of a broadcast tower can resonate with the RF frequency and become an antenna itself, with all the associated hazards of RF energy. Also, if the wire rope touches the antenna, or adjacent tower, it can cause arcing, which damages the wire rope and could lead to failure while lifting a load.

According to OSHA regulations, it is the employer's duty to assess the RF hazards employees will be exposed to on a job site, and develop a plan to ensure their safety. The FCC requires all transmitter operators to identify areas where they create dangerous RF fields, and control access to those areas with signs and procedures.

But many owners don't know their duty or don't follow the regulations. Therefore, the tower technician employer will:

- Develop an RF site safety policy;
- Assign a competent person to apply the RF safety plan to a particular job site; and
- In applying the RF site safety plan, the competent person will identify the hazards on that site and develop procedures to deal with those hazards.

Antenna identification is a critical part of assessing RF hazards. Different antennas emit varying frequencies and power levels. High power broadcast antennas for FM radio and TV will be among the most dangerous tower climbers encounter. These antennas operate at frequencies that will heat body tissue and they operate at very high levels of power. The only way to work safely around these types of tower is to turn off the power or lower the power and use protective equipment.

When turning off or reducing a power source it is essential that lock-out/tag-out procedures be utilized to avoid the unexpected return to full power while a worker is in potentially dangerous proximity to the antenna.

In other instances, personal protective equipment may be utilized to allow for work within RF fields, such as:

- Use of personnel RF monitor/alarm systems; or
- Use of RF suits.

Radio-Frequency Energy (RF) Summary

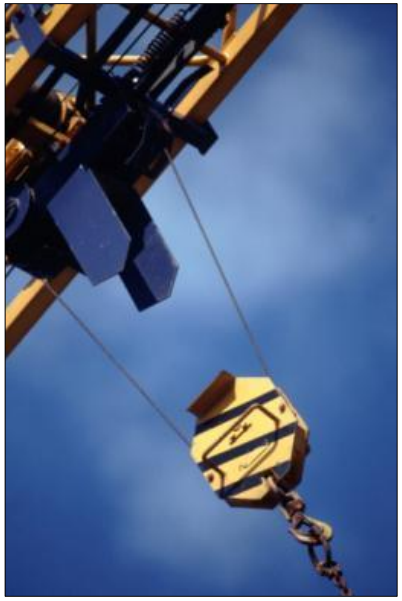
- Develop a site specific plan for addressing RF exposure.
- Assign a competent person to apply the plan.
- The competent person will identify hazards and develop procedures for addressing those hazards.

PART 7

Hoists

Part Seven – Table of Contents

A. Daily Inspections and Documentation



Are daily inspections being completed with documentation on site?

The employer shall designate a competent person who shall inspect all machinery and equipment prior to each use, and during use, to make sure it is in safe operating condition. Any deficiencies shall be repaired and any defective parts shall be replaced before continued use.

A visual inspection of the crane or drum based hoist, rigging, personnel platform and the crane or drum-based hoist support or ground shall be conducted by a competent person immediately after the trial lift to determine whether the lifting has exposed any defect or produced any adverse effect upon the component or structure.

The NATE Hoist Standard establishes criteria for inspection, testing and maintenance of a hoist.

6.0 Inspection, Testing and Maintenance:

6.0.1 The manufacturer's guidelines and recommendations shall be used; however, when not available, the following minimum guidelines shall be used:

6.0.1.1 A competent person, knowledgeable of hoists, shall complete inspections.

6.0.1.2 All repair and inspection records shall be available and accessible for a minimum of two years.

6.0.1.3 A tear down inspection record shall be available until the next teardown inspection is completed.

6.0.1.4 Any hoist that has been idle for a period of over six months shall be given an annual inspection.

6.0.1.5 Any hoist that has an unknown history of repair or maintenance shall have a tear down inspection.

6.0.2 The inspection criteria for a gear and hydraulic oil sample analysis is to evaluate the properties of the oil and the general guidelines are:

6.0.2.1 Hydraulic oil shall conform to the ISO 4406 standard for cleanliness level of 18/16/14.

6.0.2.2 Gear oil shall conform to the following gear contaminate guideline:

a) 100 to 500 ppm = Normal

b) 501 to 800 ppm = Caution

c) 801 ppm and above = Unacceptable

6.0.3 A daily inspection shall be performed which shall include at a minimum:

6.0.3.1 Engine oil level shall be checked.

6.0.3.2 Engine coolant levels shall be checked.

6.0.3.3 Check for external oil leaks.

6.0.3.4 Hydraulic oil reservoir level shall be checked.

6.0.3.5 All safety devices and brakes shall be checked to assure they function properly.

6.0.3.6 A visual inspection shall be conducted for loose or missing structural connections.

6.0.4 A semi-annual inspection shall be performed, which shall include at a minimum:

6.0.4.1 Engine oil level shall be checked.

6.0.4.2 Winch oil level shall be checked.

6.0.4.3 Engine coolant levels shall be checked.

6.0.4.4 System shall be checked for external oil leaks.

6.0.4.5 Hydraulic oil reservoir level shall be checked.

6.0.4.6 All safety devices and brakes shall be tested to assure they are functioning properly.

6.0.4.7 A visual inspection shall be conducted for loose or missing structural connections.

6.0.4.8 A complete oil analysis shall be conducted.

6.0.4.9 The winch assembly shall be dynamically tested in both the hoisting and lowering directions while under a load of at least 30% of the hoist lifting capacity.

6.0.4.10 The inspection shall be documented in writing and maintained for two years.

6.0.5 An annual inspection shall be performed, which shall include at a minimum:

6.0.5.1 Engine oil levels shall be checked.

6.0.5.2 Winch oil levels shall be checked.

6.0.5.3 Engine coolant levels shall be checked.

6.0.5.4 System shall be checked for external oil leaks.

6.0.5.5 Hydraulic oil reservoir level shall be checked.

6.0.5.6 All safety devices and brakes shall be tested to assure they are functioning properly.

6.0.5.7 A visual inspection shall be conducted for loose or missing structural connections.

6.0.5.8 A complete hydraulic and gear oil analysis shall be conducted.

6.0.5.9 The winch assembly shall be dynamically tested in both the hoisting and lowering directions while under a load of at least 30% of the hoist lifting capacity.

6.0.5.10 Lubricating oil in the hoist drum shall be changed after testing.

6.0.5.11 Hydraulic fluid and filter shall be changed after testing.

6.0.5.12 The annual inspection shall be documented and maintained for two years.

6.0.6 Teardown inspection of the winch assembly shall be performed by a qualified person:

6.0.6.1 A teardown inspection shall include the hoist being completely disassembled, cleaned and inspected, replacement of all worn, cracked, corroded, or distorted parts such as pins, bearings, shafts, gears, brake rotors, brake plates, drum, and/or base.

6.0.6.2 After a teardown inspection, a certificate shall be issued by the inspector/service person effective of the date the hoist is placed back in service. The tag shall identify the hoist mechanism, the inspector, and date of the inspection.

6.0.7 Those winch assemblies that adhere to the required daily, monthly, semi-annually, and yearly inspection criteria, shall conform to the following teardown inspection time frame:

6.0.7.1 Severe duty every 3 years.

6.0.7.2 Moderate duty every 5 years.

6.0.7.3 Infrequent use every 7 years.

6.0.8 Those winch assemblies that do not adhere to this document's inspection criteria, shall have a tear down inspection every three years.

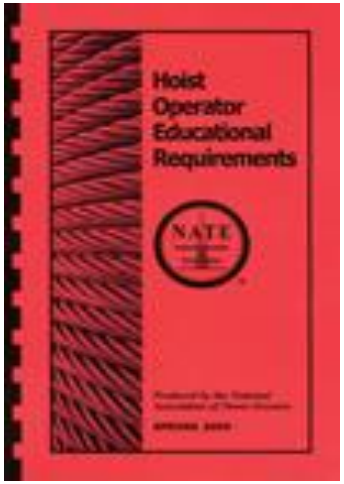
6.0.9 During any inspection, items found that may affect the performance of the unit must be repaired before use.

6.0.10 Documentation of the inspection should include but not be limited to: winch model and serial number, name and employer of repair/inspection technician, date and description of findings, parts replaced and test results.

B. Hoist Operator Qualifications

Is the hoist operator qualified?

The safety of the tower crew on site and protection of valuable equipment requires a properly qualified hoist operator. NATE has developed the *Hoist Operator Educational Requirements* manual to assist NATE members with understanding these qualifications.



The NATE Hoist Standard also provides guidance for hoist operator qualifications in the following sections:

7.0 Operator Qualifications:

7.0.1 The operator shall have documented training that consists of training on the safe operation of the hoist using the operator's manual provided by the manufacturer, company policy and rules of this document.

7.0.2 The operator shall have a minimum of 40 hours experience on the unit that they are operating or a unit that is similar, and demonstrate the ability to safely operate the unit.

7.0.3 The operator must be able to supply proof of training on request.

(7.0 Operator Qualifications Continued)

7.0.4 The operator shall have adequate eyesight for the operation.

7.0.5 The operator shall have adequate hearing for the operation.

7.0.6 The operator shall not engage in the operation of a hoist when they are physically or mentally unfit.

7.0.7 The operator shall not engage in any practice, which will divert their attention while operating.

7.0.8 The operator shall be responsible for those operations under their direct control. Whenever there is any doubt as to safety, the operator shall have the authority to stop and refuse to handle the load until the situation is remedied.

(7.0 Operator Qualifications Continued)

7.0.9 The operator shall not leave their position at the controls while personnel are suspended.

7.0.10 Before starting the hoist mechanism the operator shall:

7.0.10.1 Ensure that the daily inspection has been done.

7.0.10.2 Ensure that all controls are in the off position.

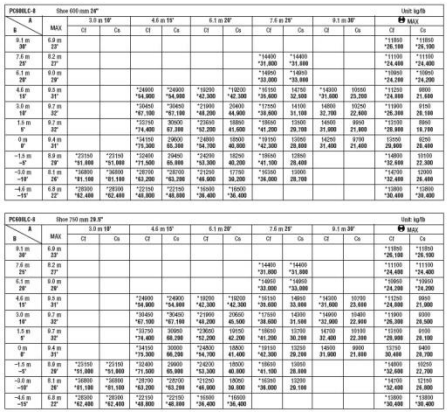
7.0.10.3 Ensure that all personnel are in the clear.

C. Load Charts

Are load charts posted and readily available to the hoist operator?

Load charts are an essential aspect of safe hoisting operations. Accordingly, load charts must be available at all times to the hoist operator.

Load charts are used to determine the lifting capacities under specified parameters and an understanding of the working parameters within which the capacities are to be used.



D. Operator's Manual

Is there an operator's manual on site?

The operator's manual provides specific and detailed information regarding all aspects of the hoist. Access to the manual is important for a variety of aspects of safe operation.

The manufacturer's hoist operator's manual is an invaluable resource regarding:

- Pre-operation checks;
- Engine operation;
- Maintenance;
- Service;
- Parts;
- Troubleshooting;
- Mechanical and wiring diagrams; and
- Safe operation of the hoist.

An owner's manual shall be available on site.

E. Headache Ball Markings

Are the headache ball markings legible?

The overhaul ball or “headache ball” must be of sufficient size and weight to overhaul the line from the highest hook position. Accordingly, all hook and ball assemblies shall be labeled with their rated capacity and weight. The ability to readily observe this information is essential to safe operations of a hoist.

The NATE *Hoist Operator's Educational Requirements* manual requires that the headache ball be visually inspected prior to each use. When inspecting the headache ball, along with reviewing markings, employees should also look for:

- Cracking;
- Modifications such as welding or cutting;
- Impact damage;
- Restricted movement or swivel; and
- Excessive wear and deformation.

If the condition of the ball indicates any type of potential defect, remove the headache ball from service immediately.

The headache ball shall also be removed from service if the hook shows more than 5% wear in critical areas or more than 10% percent wear in all other areas.

If the swivel to end fitting clearances exceeds the manufacturer's maximum tolerance, the headache ball or its assembly shall be taken out of service.

Follow the manufacturer's recommendations and precautions when making repairs.

F. End Connections

Is the end connection properly secured?

Wire rope end connections must be as specified by the manufacturer. The most common type of end connection is the wedge socket. Wedge sockets develop only 70 percent of the breaking strength of the wire rope due to the crushing action of the wedge. Swage socket, cappel socket, and zinc (spelter) socket wire rope end connections all provide 100 percent of the breaking strength of the wire rope when properly made. Exercise caution when wedge socket connections are used to make rated capacity lifts.

Wedge sockets are particularly subject to wear, faulty component fit, and damage from frequent change-outs, and are highly vulnerable to inadvertent wedge release and disassembly in a two-blocking situation. NOTE: Two-blocking is hoisting the sheaves against the boom tip sheaves. Hook block wedge sockets must be installed as specified in the following procedures:

1. Cut and remove any section of wire rope used in a socket that was subject to sharp and bending and crushing before re-socketing.

2. Install the wedge socket carefully, so the wire rope carrying the load is in direct alignment with the eye of the socket clevis pin. This ensures the load pull is direct.

3. Place the socket upright and bring the rope around in a large, easy-to-handle loop. Extend the dead end of the wire rope from the socket for a distance of at least one rope lay length. Insert the wedge in the socket, permitting the rope to adjust around the wedge.

4. As a safety precaution, install a wire rope clip on the dead end of the wire rope that comes out of the wedge socket. Measure the distance from the base of the wedge socket to the clamp. This measurement is used as a guide to check if the wire rope is slipping in the wedge socket. NOTE: Do not attach the wire rope clip to the dead end and live end of the wire rope that comes out of the socket.

G. Hoists (secured and properly anchored)

Are all hoists secured and properly anchored for the load intended?

The hoist anchorage system shall be sufficient to withstand the heaviest anticipated load calculated to include appropriate safety factors. Conducting the trial lift will verify the anchor. If there is hoist movement during the trial lift, re-evaluate the anchorage system.

Hoists must be properly mounted to ensure the safety of the operator, employees and any loads being lifted.

OSHA CPL 02-01-056 requires that hoists shall be installed following the manufacturer's mounting procedures to prevent excessive distortion of the hoist base as it is attached to the mounting surface. In particular:

- Flatness of the mounting surface shall be held to tolerances specified by the hoist manufacturer;
- The hoist shall be anchored so as to resist at least two times any reaction induced at the maximum attainable line pull and shall be anchored so that the hoist will not twist or turn; and
- If the hoist is mounted to a truck chassis, it shall be properly aligned and anchored in at least two corners to prevent movement, and the wheels shall be properly chocked.

H. Hoist Control Identification

Are hoist controls clearly identified?

The safe and efficient operation of a hoist requires that the controls can be easily identified. Instructions and warnings shall be visible to the operator while he/she is at the controls.

OSHA CPL 02-01-056 states that controls shall be clearly marked (or be part of a control arrangement diagram) and easily visible from the operator's station.

I. Hoist Control Proximity to Operator

Are the hoist controls within the operator's reach?

Hoist controls must be within the reach of the hoist operator to ensure that necessary actions related to starting and stopping the hoist, controlling the speed, shifting, and taking emergency actions – if needed – can be readily accomplished.

OSHA CPL 02-05-056 states that power plant controls shall be within easy reach of the operator and shall include a means to start and stop, control speed of internal combustion engines, stop prime mover under emergency conditions and shift selective transmissions.

- All controls used during the normal operation of the hoist shall be located within easy reach of the operator at the operator's station.

- Controls shall be self-centering controls (i.e. "deadman" type) that will return the machine to neutral and engage the drum brakes if the control lever is released.

J. Hour Meter

Is the hour meter operational and functioning properly?

All hoists shall have an hour meter and a line speed indicator. Their proper function is essential to the safe operation and related maintenance practices.

K. Communications (two-way radios)

Are two-way radios being tested daily, if being used?

When operating a hoist, communication is essential. Failure to communicate can lead to catastrophic damage to both personnel and equipment. A system of communication must be in place and clearly understood when hoisting is taking place.

The *NATE Accident Prevention, Health & Safety Program Guide* stipulates that employees being hoisted shall remain in continuous sight of and/or in direct communication with the operator or signal person. In those situations where direct visual contact with the operator is not possible, and the use of a signal person would create a greater hazard for the person being hoisted, direct communication alone, such as by radio, may be used. When hand signals are used, all employees must use industry standardized hand signals in accordance with proper crane/hoist operations.

NATE has also developed a signal guide based on existing sources of communications for the tower erection industry.

L. Guards (moving parts)

Are all exposed moving parts properly guarded?

Exposed moving parts pose a danger to workers. Guards should be in place to prevent injury from exposed moving parts.

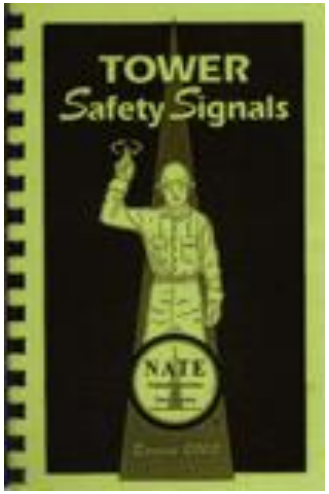
Section 5.0 of the NATE Hoist Standard requires that belts, pulleys, gears, shafts, sprockets, spindles, drums, fly wheels, chains, or other rotating parts shall be fully guarded to prevent employee contact. The standard also stipulates that all exhaust pipes shall be guarded where exposed to employee contact.

M. Hand Signal Chart

Is a hand signal chart posted and visible to all personnel on site?

In an instance where radios, for whatever reason, are not an option for communication between tower personnel and the hoist operator, an accurate understanding of signals is essential to safety.

As noted above, NATE has developed a *Tower Safety Signals* booklet to address this need.



Hoists Summary

- Designate a competent person to inspect hoists prior to each use and document any deficiencies and repairs following the *NATE Hoist Standard*.
- Review *NATE Hoist Operator Educational Requirements* for training and qualifications.
- Post load charts so they are available to the hoist operator at all times.
- Provide operator's manual on site.
- Ensure the overhaul ball is labeled with rated capacity and weight.
- Ensure end connections are properly secured.
- Verify hoists are properly and securely anchored for anticipated load and safety factors.
- Re-evaluate hoist anchorage system if the hoist moves during the trial lift.
- Clearly mark controls with instructions and warnings.
- Ensure controls are within operator's reach.
- Verify hour meter is working properly.
- Test radios daily.
- Guard all moving parts such as belts, pulleys and gears.
- Post hand signal charts.

PART 8

Personnel Lifting

Part Eight – Table of Contents

A. Hoist Approval
B. Pre-Lift Meeting
C. Pre-Lift Plan
D. Personnel Platform
E. Gin Pole(s)

A. Hoist Approval

Is the hoist approved for lifting personnel?

Personnel hoisting, when performed using established protocols, is the safest way for personnel to reach their work station on the tower and return to the ground. One of the first aspects of qualifying the safety of this procedure is ensuring the hoist is rated for lifting personnel.

OSHA CPL 2-01-056 requires the following regarding hoists for personnel lifting:

Hydraulic Hoists (Drum Hoists). The hoist used for personnel lifting shall meet the applicable requirements for design, construction, installation testing, inspection, maintenance, modification, repair and operations as referenced in Appendix A of the Directive and as prescribed by the manufacturer.

1. Where manufacturers' specifications are not available, the limitations assigned to the equipment shall be based on the determinations of a registered professional engineer. The hoist shall be positioned so that it is level and the distance between the drum and the foot block at the base of the tower will allow proper spooling of wire rope. The foot block shall be anchored to prevent displacement and be supported to maintain proper alignment.

2. The hoist shall be designed to lift materials and personnel with the same drum or drums. Any hoist that has been modified or repaired must be proof-tested to 125% of its rated capacity.

3. Rated load capacities, recommended operating speeds, and special hazard warnings or instructions shall be conspicuously posted on all hoists.

4. Belts, gears, shafts, pulleys, sprockets, spindles, drums, fly wheels, chains or other rotating parts, where exposed, shall be totally enclosed.

5. Personnel load capacity for the current configuration of the gin pole shall be posted within sight of the hoist operator.

- The hoist shall have an hour meter and a line speed limiter. The hoist shall be designed for and must use powered lowering.
- The alignment of hoist components shall be maintained within manufacturer's specified limits that prevent premature deterioration of gear teeth, bearings, splines, bushings, and any other parts of the hoist mechanism.

6. All exhaust pipes shall be guarded where exposed. An accessible fire extinguisher of 5BC rating or higher shall be available at the operator's station.

7. The hoist shall be serviced and maintained per the manufacturer's recommendations.

- The operating manuals developed by the manufacturer for the specific make and model hoist being used shall be maintained at the site at all times.

- A hoist log book shall be used to record all hoist inspections, tests, maintenance and repair. The log shall be updated daily as the hoist is being used and shall be signed by the operator and/or crew chief. Service mechanics shall sign the log after conducting maintenance and repair. The log shall be maintained at the site.

Hoist Mounting. The hoist shall be installed following the manufacturer's mounting procedures to prevent excessive distortion of the hoist base as it is attached to the mounting surface.

1. Flatness of the mounting surface shall be held to tolerances specified by the hoist manufacturer.

2. The hoist shall be anchored so as to resist at least two times any reaction induced at the maximum attainable line pull and shall be anchored so that the hoist will not twist or turn.

3. If the hoist is mounted to a truck chassis, it shall be properly aligned and anchored in at least two corners to prevent movement, and the wheels shall be properly chocked.

Drums. The hoist drum shall be capable of raising or lowering 125% of the rated load of the hoist.

1. The hoist drum shall have a positive means of attaching the wire rope to the drum.

2. There shall always be at least three full wraps of wire rope on the hoist drum when personnel are being hoisted.

3. During operation, the flange shall be two times the wire rope diameter higher than the top layer of wire rope at all times.

Brakes and Clutches. Brakes and clutches shall be capable of arresting any over-speed descent of the load.

1. The hoist shall be provided with a primary brake and at least one independent secondary brake, each capable of stopping and holding 125% of the lifting capacity of the hoist.

- The primary brake shall be directly connected to the drive train of the hoisting machine, and shall not be connected through belts, chains, clutches or screw-type devices.

- The secondary brake shall be an automatic emergency-type brake that, if actuated during each stopping cycle, shall not engage before the hoist is stopped by the primary brake. When a secondary brake is actuated, it shall stop and hold the load within a vertical distance of 24 inches.

2. Brakes and clutches shall be adjusted, where necessary, to compensate for wear and to maintain adequate force on springs where used. Powered lowering must be used.

3. When power brakes that do not have continuous mechanical linkage between the actuating and braking mechanism are used for controlling loads, an automatic means shall be provided to set the brake to prevent the load from falling in the event of loss of brake actuating power.

4. Static brakes shall be provided to prevent the drum from rotating in the lowering direction and shall be capable of holding the rated load indefinitely without attention from the operator. Brakes shall be automatically applied upon return of the control lever to its center (neutral) position.

5. Brakes applied on stopped hoist drums shall have sufficient impact capacity to hold 1.5 times the rated torque of the hoist.

Hoist Controls. Power plant controls shall be within easy reach of the operator and shall include a means to start and stop, control speed of internal combustion engines, stop prime mover under emergency conditions, and shift selective transmissions.

1. All controls used during the normal operation of the hoist shall be located within easy reach of the operator at the operator's station.

2. Controls shall be clearly marked (or be part of a control arrangement diagram) and easily visible from the operator's station. Foot-operated pedals where provided, shall be constructed and maintained so the operator's feet will not readily slip off and the force necessary to move the pedals can be easily applied.

3. The controls shall be self-centering controls (i.e., "deadman" type) that will return the machine to neutral and engage the drum brakes if the control lever is released.

B. Pre-Lift Meeting

Has a pre-lift meeting been held, documented and made available on site?

To ensure proper attention is being paid to requisite requirements of personnel hoisting, all tower personnel involved in any aspect of hoisting personnel will attend a pre-lift meeting. OSHA has outlined what aspects of the lift must be covered and documented during that meeting.

Photo Courtesy of Pat Cipov, Cipov Enterprises, Inc.

OSHA Directive 02-01-056 establishes the following requirements for a pre-lift meeting.

Pre-Lift Meeting. A pre-lift meeting shall be held prior to the trial lift at each location. The pre-lift meeting shall:

- Be attended by the hoist operator, employees to be lifted, and the crew chief;
- Review the procedures to be followed and all appropriate requirements contained in this guideline; and
- Be repeated for any employee newly assigned to the operation.

Documentation. All trial lifts, inspections and proof tests shall be documented, and the documentation shall remain on site during the entire length of the project. The pre-lift meeting shall be documented, and the documentation shall remain on site during the entire length of the project.

Hoisting an Employee to the Work Station. Except where an employer can demonstrate that specific circumstances or conditions preclude its use, a personnel platform must be used to hoist more than one employee to the work station. That personnel platform must meet the requirements of 29 CFR 1926.550 (g).

1. When a boatswains seat-type or full body seat harness is used to hoist employees, the following shall apply:

- No more than two employees may be hoisted at a time;
- The employee's harness shall be attached to the hook by a lanyard meeting the strength requirements of 29 CFR 1926.502;
- Only locking-type snap hooks shall be used;
- The harness shall be equipped with two side rings and at least one front and one back D ring; and
- The hoist line hook shall be equipped with a safety latch which can be locked in a closed position to prevent loss of contact.

2. When a personnel platform cannot be used, the following provisions must be followed:

- The maximum rate of travel shall not exceed 200 feet per minute when a guide line is used to control personnel hoists. When a guide line cannot be used, the rate of travel of the employee being hoisted shall not exceed 100 feet per minute.
- In all personnel hoist situations, the maximum rate shall not exceed 50 feet per minute when personnel being lifted approach to within 50 feet of the top block.
- The use of free-spooling (friction lowering) is prohibited. When the hoist line is being used to raise or lower employee(s), there shall be no other load attached to any hoist line, and no other load shall be raised or lowered at the same time on the same hoist.
- As-built drawings approved by a registered professional engineer shall provide the lifting capacity of the gin pole and shall be available at the job site.
- The gin pole raising line shall not be used to raise or lower employees. Employees must maintain 100% tie-off while moving between the hoist line and the tower.

C. Pre-Lift Plan

In the pre-lift plan, was the trial lift completed and documented?

A trial lift of the maximum intended personnel load shall be made from the ground level to the location to which personnel are being hoisted. This trial lift will be conducted and documented as part of pre-lift planning.

Trial Lift and Proof Testing. A trial lift of the maximum intended personnel load shall be made from ground level to the location to which personnel are to be hoisted.

1. The trial lift shall be made immediately prior to placing personnel on the hoist line.

2. The hoist operator shall determine that all systems, controls and safety devices are activated and functioning properly.

3. A single trial lift may be performed for all locations that are to be reached from a single set-up position.

4. The hoist operator shall determine that no interference exists and that all configurations necessary to reach those work locations remain under the limit of the hoist's rated capacity as identified in paragraph 2(e), and additionally maintain a 10:1 factor of safety against failure.

5. The trial lift shall be repeated prior to hoisting employees whenever the hoist is moved and set up in a new location or returned to a previously used position.

6. After the trial lift, employees shall not be lifted unless the following conditions are met:

- Hoist wire ropes are determined to be free of damage in accordance with the provisions of 29 CFR 1926.550;
- Multiple part lines are not twisted around each other; and,
- The proof testing requirements have been satisfied.

7. If the hoist wire rope is slack, the hoisting system shall be inspected to ensure that all wire ropes are properly seated on drums and in sheaves.

8. A visual inspection of the hoist, rigging, base support and foundation shall be made by a competent person immediately after the trial lift to determine whether testing has exposed any defect or adverse effect upon any component of the structure.

- Any defects found during the inspection which may create a safety hazard shall be corrected, and another trial lift shall be performed before hoisting personnel.

- Prior to hoisting employees and after any repair or modification, the personnel rigging shall be proof tested to 125% of the greatest anticipated load by holding it in a suspended position for five minutes with the test load evenly distributed (this may be done concurrently with the trial lift).

- After proof testing, a competent person shall inspect the rigging. Any deficiencies found shall be corrected and another proof test shall be conducted.

D. Personnel Platform

If a personnel platform is on site, does it have an identification plate with the proper data in place?

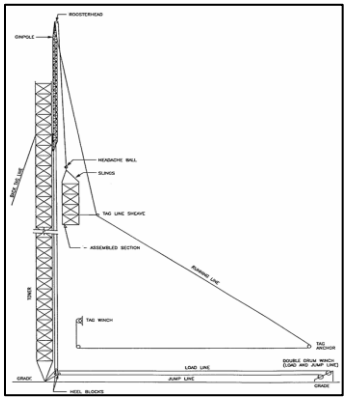
Proper data on the plate of a personnel platform includes weight of the platform, maximum intended load and employee capacity.

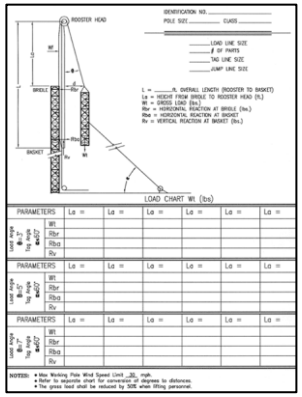
E. Gin Pole(s)

If a gin pole is being used, does it have a load chart?

Gin poles should always have load charts for determination of maximum load. This practice is, of course, also mandated when hoisting personnel to and from their work stations.

OSHA CPL 02-01-056 requires that the personnel load capacity and material capacity of the lifting system in use shall be posted at the site near the location of the hoist operator. If the system is changed, (for example, if the gin pole angle is changed), the posted capacity shall be changed accordingly.





Personnel Lifting Summary

- Adhere to practices established in CPL 02-01-056.
- Ensure hoist is rated for lifting personnel.
- Hold pre-lift meeting on site and document information presented.
- Conduct and document a trial lift as part of pre-lift planning.
- Personnel platforms on site must have data on the plate including weight of the platform, maximum intended load and employee capacity.
- Gin poles must have load charts with personnel and load capacity posted. If the system is changed, the posted capacity shall be changed accordingly.

PART 9

Rigging and Blocks

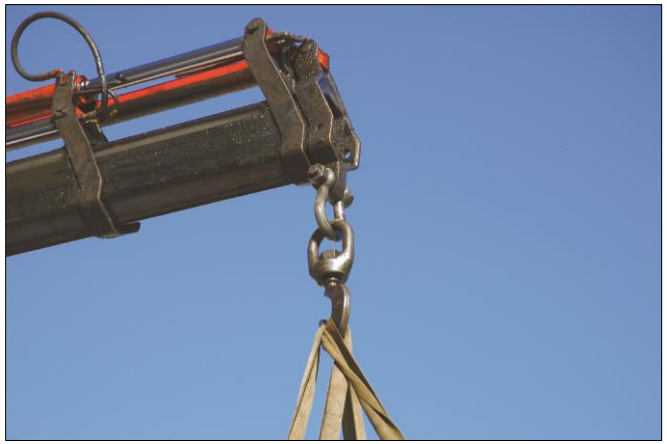
Part Nine – Table of Contents

A. Rigging Practices
B. Rigging Equipment
C. Synthetic Slings
D. Inspection (daily and documented)
E. Tag Line

A. Rigging Practices

Are proper rigging practices being utilized?

Proper rigging is essential to safe operations. A competent person should oversee all rigging on the jobsite to ensure proper procedures are being followed.



Rigging practices include the knowledge and experience to apply the following on the jobsite:

- Determinations of proper type and size of wire rope, synthetic rope, slings and associated hardware;
- Knowledge of proper use of blocks and determination of block loading;
- Ability to determine capacity of equipment;
- Ability to calculate the diminished capacity of equipment as angles change;
- How sling angles change the force being placed on a load;
- Ability to understand the proper use and safety precautions associated with hoists and capstan hoists.

B. Rigging Equipment

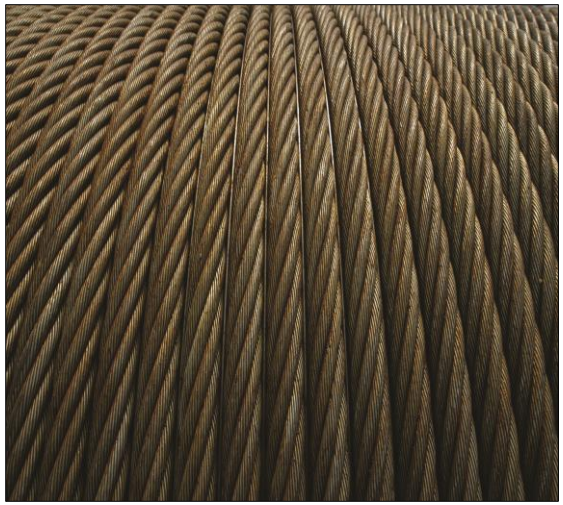
Is rigging equipment in good condition?

To ensure that rigging equipment is in proper condition for continued use, inspections should be conducted daily of any rigging equipment to be used on the job site.

All rigging equipment must be inspected daily before use including the following:

- Cables;
- Slings;
- Shackles;
- Hooks;
- Wedge sockets; and
- Blocks, etc.

Defective equipment must be removed from service.



C. Synthetic Slings

Are the tags on synthetic slings legible?

Synthetic slings should be manufactured with a rated capacity tag. This tag should be legible to ensure that slings are not used beyond capacity.

The NATE *Hoist Operator's Educational Requirements* manual established that:

- The tag should identify the manufacturer and the date the sling was manufactured; and
- The tag should also identify the sling's capacity and indicate the workload limit of the sling when used in a vertical, choker, or vertical basket configuration.

D. Inspection (daily and documented)

Is rigging equipment being inspected daily and the inspection documented?

To ensure that rigging equipment is in proper condition for continued use, inspections should be conducted daily of any rigging equipment to be used on the job site.

All rigging equipment must be inspected daily before use including the following:

- Cables;
- Slings;
- Shackles;
- Hooks;
- Wedge sockets; and
- Blocks, etc.


DAILY INSPECTION TAG
HOIST/CRANE AND ASSOCIATED LIFTING EQUIPMENT

Defective equipment must be removed from service.

E. Tag Line

Are tag lines in good condition?

A visual inspection of all tag lines being used should be conducted daily prior to any hoisting operations. Tag lines should be free of visible defects, damage, or corrosion that could cause the line to fail during operations. Tag lines showing signs of damage to an extent that could lead to failure of the line should be removed from service.

Rigging and Blocks Summary

- Appoint a competent person to oversee rigging and ensure proper procedures are followed.
- Inspect and document rigging equipment and tag lines daily, with any defective equipment being removed from service immediately.
- Ensure synthetic sling rated capacity is legible and slings are not used beyond capacity.

PART 10

Gin Poles

Part Ten – Table of Contents

A. Gin Pole Rigging

Is gin pole rigging in good condition?

Proper rigging is essential to safe gin pole operations. Beyond that, the condition of the rigging is also a vital component to site safety. Components such as moving equipment, attachments, and gin pole attachment points are all areas where the condition of the equipment is paramount.

A competent person on site shall inspect all components of gin pole rigging before each use of the equipment to ensure there are no structural defects, deterioration or indications that the use or functionality of the equipment has been compromised. Defective equipment shall be removed from service.

TIA 1019 outlines the requirements for equipment associated with a lifting operation and common equipment used to attach the gin pole to the tower.

This includes the following items:

- Wire Rope;
- Sheaves;
- Rotating Rooster Heads;
- Blocks;
- Chokers;
- Shackles;
- Chains;
- Turnbuckles;
- Links; and
- Hooks.

B. Identification Tags

Does the gin pole have an identification tag?

Gin poles shall have identification markings.

TIA 1019 requires that:

- Each gin pole shall be permanently marked with an identification number that references a specific load chart; and
- For proper assembly, each section of the gin pole shall be marked in a specified sequence.

C. Gin Pole Pre-Job Inspection

Was a pre-job inspection of the gin pole conducted?

Companies should have well-established policies for performing inspections on their gin poles. For their safety, an experienced crew will know and follow their company inspection polices.

TIA 1019 notes that experienced crews know that the condition of the gin pole and the site makes each situation unique. Crew members must look at all areas of the gin pole for items such as:

- Loose of missing support members;
- Damaged support members;
- Corrosion; or
- Signs of obvious misuse.

If any of these are identified during inspection or at any point during the use of a gin pole; corrective action must be taken before placing a gin pole into service.

D. Rooster Head Sheaves

Does the sheave in the Rooster Head match the wire rope (If visible)?

Compatibility of the rooster head sheave and the diameter of wire rope are essential for safe operation.

TIA 1019 stipulates that the strength capacity of the sheave assembly shall equal or exceed the strength capacity of the wire rope to be used with the sheave.

Gin Poles Summary

- Inspect and document gin pole and rigging before each use.
- Ensure gin pole has identification tag.
- Ensure compatibility of rooster head and wire rope diameter.

PART 11

Ladders

Part Eleven – Table of Contents

A. Maintenance
B. Size and Slope
C. Location
D. Stability

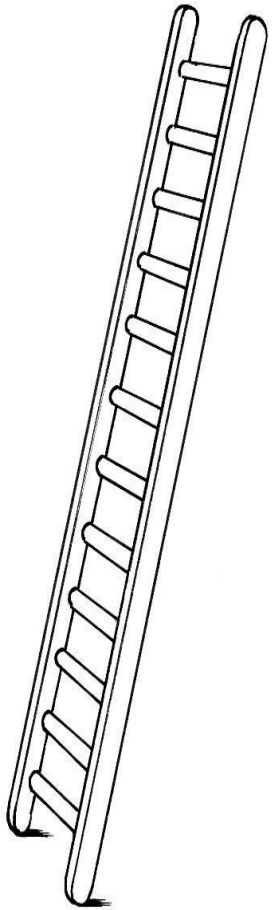
A. Maintenance

Are the units well maintained and in good working order?

Proper operational condition of ladders can mean the difference in safe operations and serious injury. Ladders must be maintained and free of any material that could promote slipping.

29 CFR 1926.1053 (b) states that ladders shall be maintained free of oil, grease and other slipping hazards.

Safety climb devices on fixed ladders should be inspected to ensure they are properly maintained and in good working order.



B. Size and Slope

Is ladder at the proper slope?

The proper slope for a ladder is a 4:1 ratio. This is to ensure the ladder does not slip out from under the worker utilizing the ladder.

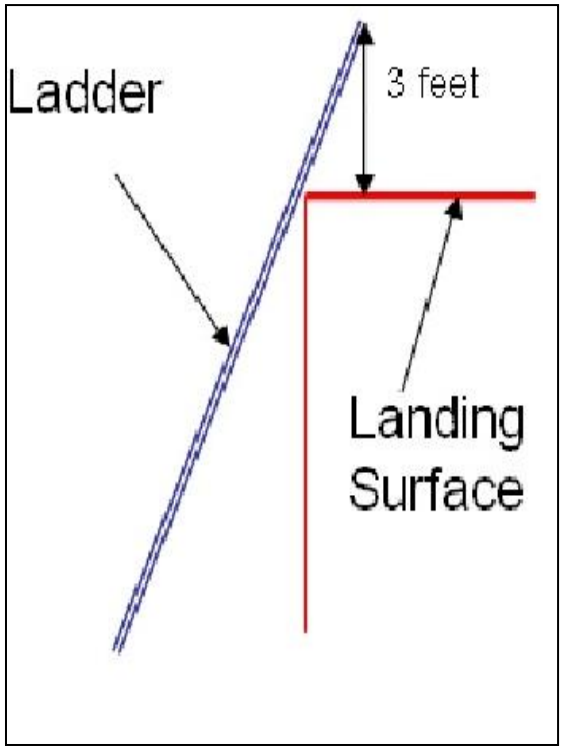
29 CFR 1926.1053(b) requires that non-self-supporting ladders shall be used at an angle such that the horizontal distance from the top support to the foot of the ladder is approximately one quarter of the working length of the ladder (the distance along the ladder between the foot and the top support.)

C. Location

Does the ladder extend 36 inches past the landing?

Ladders must extend three feet beyond the upper landing surface to which the ladder is being used to gain access. This requirement is in place to prevent a ladder from slipping off its support when in use.

29 CFR 1926.1053(b) stipulates that when portable ladders are used for access to an upper landing surface, the ladder side rails shall extend at least 3 feet above the upper landing surface to which the ladder is used to gain access, or when such an extension is not possible because of the ladder's length, then the ladder shall be secured at its top to a rigid support. In no case shall the extension be such that ladder deflection under a load would, by itself, cause the ladder to slip off its support.



D. Stability

Is the ladder stable, on good ground?

Ladders must be placed on a surface that will prevent slipping while in use. This should include areas where ladders can be displaced by work place activity.

29 CFR 1926.1053(b) requires that ladders shall be used only on stable and level surfaces unless secured to prevent accidental displacement.

Ladders shall not be used on slippery surfaces, unless secured or provided with slip-resistant feet to prevent accidental displacement. Slip-resistant feet shall not be used as a substitute for care in placing lashing or holding a ladder that is used on slippery surfaces such as flat metal or concrete that cannot be prevented from becoming slippery.

Ladders Summary

- Maintain and inspect ladders.
- Ensure proper ladder slope 4:1 ratio and extend three feet beyond upper landing surface.

PART 12

Top 10 OSHA Violations for 2014

OSHA's Top 10 Most Frequently Cited Standards in Fiscal Year 2014

1. Fall Protection (29 CFR 1926.501)
2. Hazard Communication (29 CFR 1910.1200)
3. Scaffolding (29 CFR 1926.451)
4. Respiratory Protection (29 CFR 1910.134)
5. Powered Industrial Trucks (29 CFR 1910.178)
6. Lockout/Tagout (29 CFR 1910.147)
7. Ladders (29 CFR 1926.1053)
8. Electrical, Wiring Methods (29 CFR 1910.305)
9. Machine Guarding (29 CFR 1910.212)
10. Electrical, General Requirements (29 CFR 1910.303)

PART 13

Ten Hazard Red Flags

Ten Hazard Red Flags

1. Lack of proper training;
2. Failure to develop a site safety plan outlining potential hazards relevant to this job;
3. Failure to conduct a tailgate session to review site concerns with tower;
4. Failure to utilize proper fall protection equipment;
5. Failure to utilize additional PPE;
6. Failure to utilize the required practices for personnel hoisting;
7. Failure to recognize proper anchorages on the tower;
8. Lack of proper hoist operator training;
9. Errors in rigging including proper utilization of chokers, blocks, hoist and gin pole; and
10. Failure to recognize and address potential electrical hazards on site.

Thank you for your interest in the NATE Tower Site Hazard Recognition Guide. We hope this safety resource will help you more readily recognize potential safety hazards on broadcast and communications tower sites.

NATE would like to recognize all past and present members who contributed to this project.

For more information, visit NATE's website at www.natehome.com.

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