Wireless Rooftop Deployment Training Course

STUDENT WORKBOOK

Susan Harwood Grant SH-05134-SH9

NATE
THE COMMUNICATIONS INFRASTRUCTURE CONTRACTORS ASSOCIATION

NATE WIN
WIRELESS INDUSTRY NETWORK

COURSE OBJECTIVES

Enhance…
knowledge OSHA and NATE

Provide…
overview of wireless rooftop deployment safety practices and industry fatalities

Enhance…
awareness and knowledge of the current laws, regulations, and standards

Enhance…
awareness of the potential hazards and exposures associated with rooftop work

Advance…
awareness through the application of the hierarchy of controls

Enhance…
awareness in recognizing and documenting rooftop hazards

Understanding…
of radio frequency program, signage, personal protection monitor, mitigation, and plans

Identify…
appropriate fall protection system(s) and methods

Demonstrate…
knowledge to identify hazards/exposures and apply the appropriate risk mitigation practice(s)

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Wireless Rooftop Deployment Training

U.S. Department of Labor - OSHA
Susan Harwood Grant
SH-05134-SH9

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Acknowledgement

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Introduction

Wireless Rooftop Deployment Topics

The training is organized into the following nine topic sections:

- Section 1: Introduction to NATE and OSHA
- Section 2: State of the Industry
- Section 3: Applicable Laws, Regulations, and Standards
- Section 4: Potential Rooftop Hazards
- Section 5: Hierarchy of Controls Overview
- Section 6: Pre-Task Planning and Job Hazard Assessment
- Section 7: Radio Frequency (RF) Hazards and Mitigation
- Section 8: Fall Protection
- Section 9: Practical Workshop

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Wireless Rooftop Deployment Course Objectives

- Section 1: Enhance students knowledge of the roles of OSHA and NATE.
- Section 2: To provide a course overview video of wireless rooftop deployment safety practices and examine industry fatalities that occurred while working on rooftops.
- Section 3: Enhance awareness and knowledge of the current laws, regulations, and standards while working on rooftops.
- Section 4: Enhance awareness of the potential hazards and exposures associated with rooftop work within the telecommunications industry.
- Section 5: Advance awareness in approaching rooftop hazards through the application of the hierarchy of controls.

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Introduction

Wireless Rooftop Deployment Course Objectives

- Section 6: Enhance awareness in recognizing and documenting rooftop hazards by applying control measures through pre-task planning and assessment(s).
- Section 7: Understanding of radio frequency program, signage, personal protection monitor, mitigation, and plans to ensure safe working while on rooftop environments.
- Section 8: Identify, plan, and apply the appropriate fall protection system(s) and methods based on the rooftop environment and scope of work.
- Section 9: Demonstrate the knowledge to identify hazards/exposures and apply the appropriate risk mitigation practice(s) within a rooftop environment.

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Turning Point Technology

In this training you will utilize **Turning Point** interactive response software.

You will be asked questions and receive real-time feedback with handheld mobile devices. Results are instantly displayed on the screen and collected in detailed reports to ensure all participants are accounted for.

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Pancake : Griddle :: Hamburger : ?

A. Lettuce
B. Grill
C. Bun
D. Ketchup

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What is your age?

A. 18-24
B. 25-34
C. 35-44
D. 45-54
E. 55-64
F. 65 and up

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Introduction

What is the size of your employer?

A. I don't know
B. 2-10 employees
C. 11-50 employees
D. 51-100 employees
E. More than 150 employees

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Are you an employee or employer?

A. Employee (I am an employee at my company)
B. Employer/Manager/Supervisor

10

What primary sector do you service?

A. Wireless
B. Broadcast
C. Wireless and Broadcast
D. Utilities
E. Public Safety
F. Electrical
G. Solar
H. Real Estate Owner/Manager

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Does your company directly perform work activities at rooftop sites?

A. Yes
B. No

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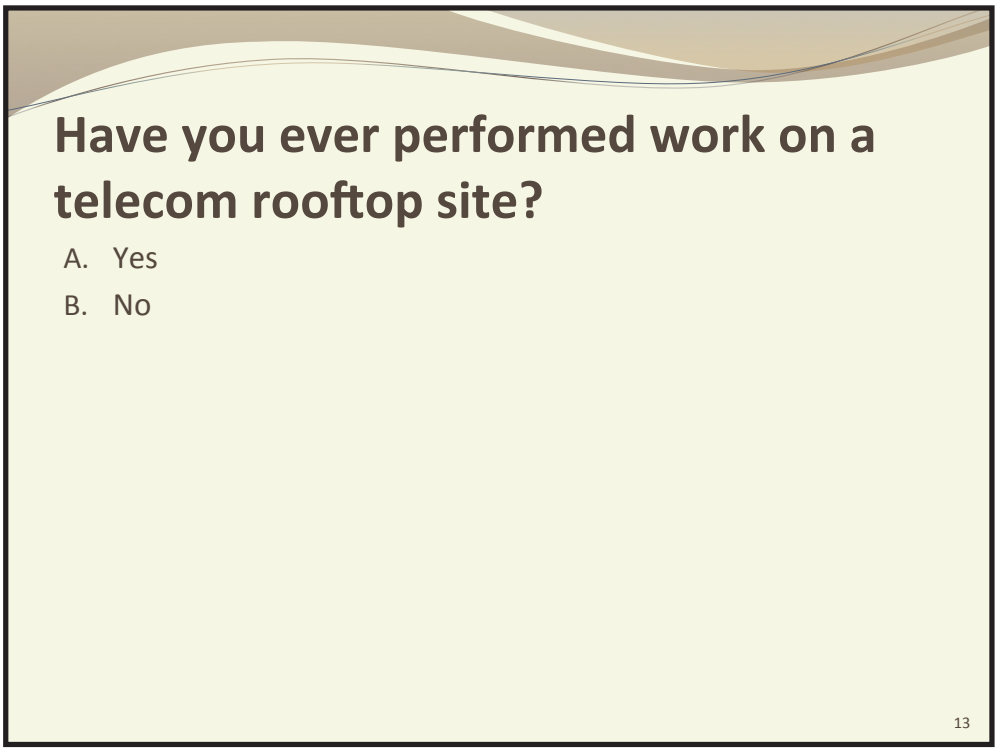
Introduction



NOTES:

Section 1

Introduction to NATE and OSHA

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NATE and OSHA Topics

- Introduction to NATE and OSHA
- Importance of NATE and OSHA
- Responsibilities of the employer under OSHA
- Employee rights under OSHA

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Introduction to NATE and OSHA

About NATE

- Global leader in industry safety and best practices for 25 years
- Voice of communications infrastructure, service, and maintenance industry
- Diverse membership make-up consisting of over 900 member companies

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About OSHA

On December 29, 1970, President Nixon signed the **Occupational Safety and Health Act of 1970 (OSH Act)** into law. The OSH Act created the **Occupational Safety and Health Administration (OSHA)** to assure safe and healthful working conditions for working men and women by setting and enforcing standards and by providing training, outreach, education, and assistance.

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What Does OSHA Do?

- Works with employers and employees to reduce workplace hazards through partnerships and alliances;
- Introduces new or improves upon existing safety and health programs;
- Utilizes consensus standards through an agreement with ANSI;
- Educates on safety and health rules that are designed to protect workers;
- Enforces the rules through inspection and citations;
- Monitors job-related injuries and illnesses through electronic records and reporting; and
- Conducts a variety of inspections to include: accidents, fatalities, complaints and programmed inspections.

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Workers Have the Right To:

- Safe and healthful working conditions;
- File a confidential complaint with OSHA in regards to safety and/or health concerns in the workplace;
- Review records of work-related injuries and illnesses;
- Receive training regarding the OSHA standards that apply to their workplace;
- Report any injury or illness without retaliation or discrimination;
- Obtain copies of test results done to find hazards in the workplace; and
- Obtain copies of their medical records.

Source: OSHA 3021-09R 2011, www.osha.gov/workers.html

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Introduction to NATE and OSHA

Employers Must:

- Provide a workplace free from recognized hazards and comply with standards, rules and regulations issued under the OSH Act;
- Eliminate or reduce hazards by making feasible changes in working conditions;
- Not discriminate against employees who exercise their rights under the Act;
- Inform employees of hazards through training, labels, alarms, etc.;
- Train employees in a language/vocabulary employees can understand; and
- Keep accurate records of work-related injuries and illnesses.

Source: OSHA 3021-09R 2011, www.osha.gov/workers.html

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OSHA Whistleblower Protection

- Visit www.osha.gov/workers/index.html or call **800-321-OSHA.**
- Be prepared to provide specific details regarding your company and the type of hazard or discrimination being reported.
- Keep a confidential record of all details.
- Once a complaint is filed or reported, an investigation is normally warranted (see criteria on website).

Source: OSHA 3021-09R 2011, www.osha.gov/workers.html

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Section 1

Review Questions

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What OSHA whistleblower statutes are designed to provide employees the freedom to report violations and protect employees from the following acts of retribution?

A. Being blacklisted

B. Demotion

C. Being denied promotion or overtime

D. Pay reduction

E. All of the above

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Introduction to NATE and OSHA

Employees can report hazards and violations to OSHA through which mediums?

A. By phone: 800-321-OSHA

B. By website: https://www.osha.gov/workers/index.html

C. All of the above

D. None of the above

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NOTES:

Section 2

State of the Industry

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State of the Industry Topics

- #ClimberConnection Rooftop Deployment Overview Video
- Industry Statistics
- Incident Review

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State of the Industry

Wireless Rooftop Deployment Video

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2019 CTIA Annual Survey Results

- Wireless data use almost doubles in one year. This year, we saw mobile data grow by **12.89 trillion MBs to a total of 28.58 trillion.**
- In 2018, Americans connected another **21.5 million mobile devices for a total of 421.7 million devices.**
- This equates to **nearly 1.3 devices for every person in the country.**
- In 2018, **349,344 cell sites** were in **operation - - up 8 percent from previous year.**

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On Smart Phones and Pixie Dust

Demand for technician crews is sky high— whether it's working a 50-foot cell tower or a 2,000-foot broadcast tower. And it's easy to take for granted when our cell phones and televisions work, but it's not magic or pixie dust. It's hard, often gritty, and even dangerous work that ensures America's communications services continue to work well and are upgraded as technology improves.

(FCC Commissioner Brendan Carr; NATE UNITE February 2019)

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Wireless Estimator Fatality Tracker

According to news website ***Wireless Estimator***, the industry experienced ten fatalities in 2014, four fatalities in 2015, seven fatalities in 2016, eight fatalities in 2017, five fatalities in 2018 and eight fatalities in 2019. Communication tower related accidents and fatalities stemming from falls, RF exposure and other hazards have been well chronicled, but **industry fatalities have also occurred at rooftop sites through the years as well.**

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State of the Industry

Perspective Industry Fatality Statistics

Year	Fatalities
2003	15
2004	11
2005	7
2006	19
2007	11
2008	12
2009	5
2010	7
2011	7
2012	1
2013	14
2014	10
2015	4
2016	7
2017	8
2018	5
2019	8
Total Fatalities	151

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2018 Industry Rooftop Fatality

In **April of 2018** a tower technician died after he was electrocuted upon coming into contact with a 13kv power line while working on an LTE installation on a rooftop in Puerto Rico.

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2016 Industry Rooftop Fatality

In **November of 2016** a tower technician fell to his death in Chula Vista, California while working on a rooftop installing transmission lines. The technician died after falling approximately 30 feet from a two-story medical office building rooftop where the work was being conducted.

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2008 Industry Rooftop Fatality

In **October of 2008**, a technician was working on a rooftop in Ellensburg, Washington when he fell through a skylight to a concrete floor and was killed.

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State of the Industry

Moral of the Story

Rooftop telecom sites present as many hazards as traditional communication tower sites. Be **vigilant** while deploying and maintaining infrastructure on rooftop locations!

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NOTES:

Section 3

Applicable Laws, Regulations, and Standards

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Applicable Laws, Regulations and Standards

Laws

- Laws are the products of written statutes, passed by either the U.S. Congress or State Legislatures. The legislatures create bills that, when passed by a vote, become statutory law.
  - Clean Air Act
  - Fair Labor Standards Act
  - Occupational Safety and Health Act

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Regulations

- Regulations, on the other hand, are standards and rules adopted by administrative agencies that govern how laws will be enforced.
  - OSHA 1926 – (construction)
  - OSHA 1910 – (general industry)

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Voluntary Standards

- Voluntary standards are standards established generally by private-sector bodies and that are available for use by any person or organization; private or government. The term includes what are commonly referred to as 'industry standards' as well as 'consensus standards.'
  - Industry – (ANSI/ASSP A10.48)
  - Quality – (ISO 45001)
  - Safety – (ANSI Z359)
  - TIA – (ANSI/TIA -222-H)
  - TIA – (ANSI/TIA 322)

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International/Local Building Codes

- The **International Building Code** (**IBC**) is a model building code developed by the International Code Council (ICC). It has been adopted for use as a base code standard by most jurisdictions in the United States. The IBC recognizes the TIA 222 standard as the governing standard for communications structures.
- **Local Building Codes:** The main purpose of local building codes is to protect public health, safety, and general welfare as they relate to the construction and occupancy of buildings and structures.

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Applicable Laws, Regulations and Standards

Applicable Rooftop Regulations

Regulation	Application
International/Local Building Codes	Building codes are regulations that set forth standards to which buildings must conform.
OSHA 1926 (construction)	Safety and Health Regulations for Construction.
OSHA 1910 (general industry)	Occupational Safety and Health Standards.

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Applicable Rooftop Standards

Standard	Title	Application
ANSI/ASME B30.9,.10,.26,.30	Safety Standard for Cableways, Cranes, Derricks, Hoists, Hooks, Jacks, and Slings	Standards for any/all rigging components involved in an overhead lift.
ANSI/ASSP A10.48	Criteria for Safety Practices With the Construction, Demolition, Modification, and Maintenance of Communication Structures	Means and methods for work being performed on telecommunications sites.
ANSI/ISEA 121	Standard for Dropped Object Prevention Solutions	This standard establishes minimum design, performance, testing and labeling requirements.

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Applicable Rooftop Standards (cont.)

Standard	Title	Application
ANSI/ISEA Z87	Standard for Occupational and Educational Personal Eye and Face Protection Devices	Standard sets forth requirements for the design, construction, testing, and use of eye protection devices, including standards for impact and penetration resistance.
ANSI/ISEA Z89.1	Standard for Industrial Head Protection	This standard describes types and classes, testing, and performance requirements for protective helmets. These include recommended safety requirements for authorities considering the establishment of regulations or codes concerning the use of protective helmets.

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Applicable Rooftop Standards (cont.)

Standard	Title	Application
ANSI/TIA-222-H	Structural Standard for Antenna Supporting Structures, Antennas and Small Wind Turbine Support Structures	Standard for the design, analysis and condition assessment of antenna support structures.
ANSI/TIA-322	Loading, Analysis, and Design Criteria Related to the Installation, Alteration and Maintenance of Communication Structures	Standards related to the installation alteration and maintenance of communication structures.

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Applicable Laws, Regulations and Standards

Applicable Rooftop Standards (cont.)

Standard	Title	Application
FCC-OET 56	Questions and Answers About Biological Effects and Potential Hazards of Radio Frequency Electromagnetic Fields	Understanding effects of overexposure and how to mitigate and manage exposure.
FCC- OET 65	Evaluating Compliance With FCC Guidelines for Human Exposure to Radio Frequency Electromagnetic Fields	Understanding allowable limits of RF exposure to humans.
NATE CTS	NATE Climbing Training Standard	Training topics which must be covered to be in compliance with the standard.

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Imagine a World With no Laws, Regulations or Standards…

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Section 3

Review Questions

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Which standard applies to RF/EME?

A. FCC/OET 56 & 65

B. ANSI/ASME B30

C. ANSI/ASSP A50 & 70

D. OSHA 1952

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Applicable Laws, Regulations and Standards

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Potential Rooftop Hazards

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Elevator Equipment Rooms

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Potential Rooftop Hazards

Window Cleaning Equipment

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HVAC Equipment

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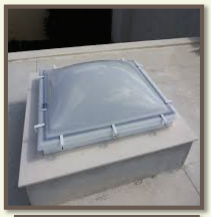
Potential Rooftop Hazards

Skylights / Hatches / Holes



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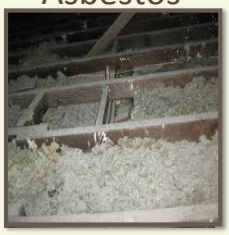
Rooftop Hazards

Asbestos



Silica

Lead

Respiratory Fumes

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Potential Rooftop Hazards

Animals / Insects / Bird Droppings

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More Rooftop Hazards

Weather

Slips / Trips / Falls

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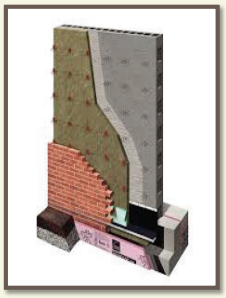
Structural Defects



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Fire and Emergency

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Potential Rooftop Hazards

Falls From Elevation
Unprotected Edges

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RF/EME

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Dropped Objects

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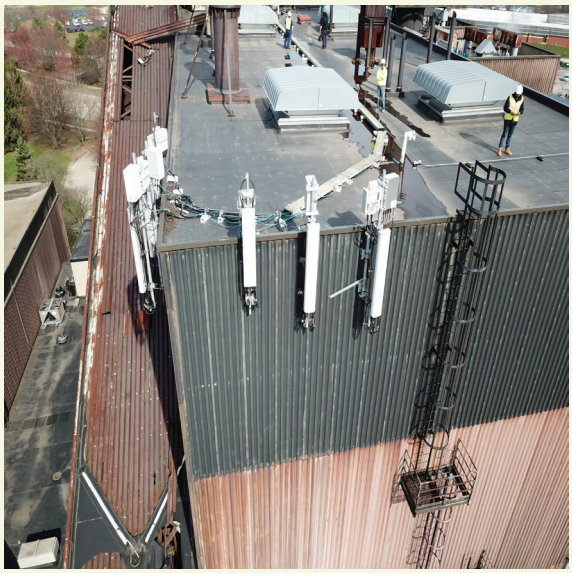
Ladders: Portable and Fixed



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Potential Rooftop Hazards

Access and Training

Unauthorized Access

Improper Training

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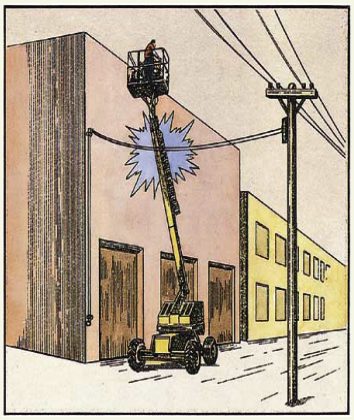
Electrical Lines



Overhead and on Building

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Inadequate Existing Equipment

Anchors and
Horizontal Lifelines

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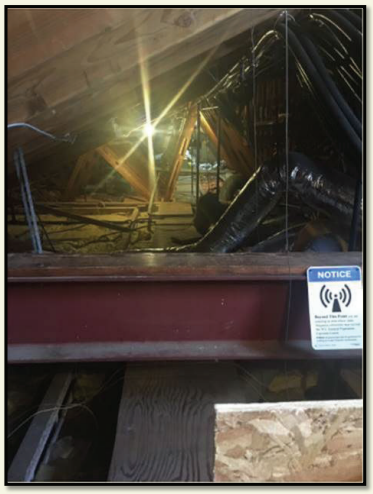
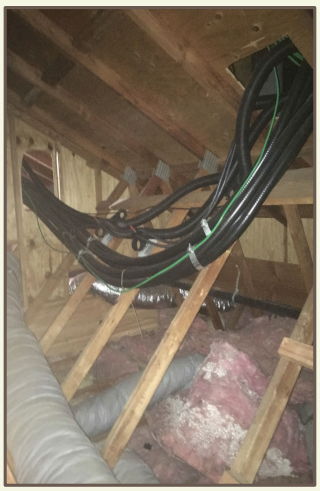
Confined Spaces





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Section 4

Review Questions

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Which item must be marked if present?

A. Improvised anchor capacity

B. Guardrail height

C. Rooftop hole

D. Skylight locations

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What should take place on a rooftop prior to work?

A. Fire escape plan

B. Notification to building management

C. Job Hazard Analysis (JHA)

D. All of the above

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NOTES:

Hierarchy of Controls Overview

Section 5

Hierarchy of Controls Overview

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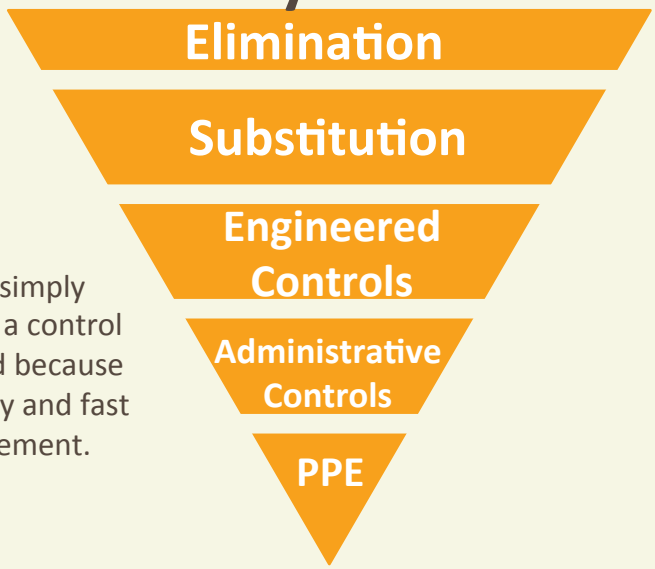
Hierarchy of Controls



Do not simply choose a control method because it is easy and fast to implement.

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Hierarchy of Controls Overview

Elimination

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Substitution

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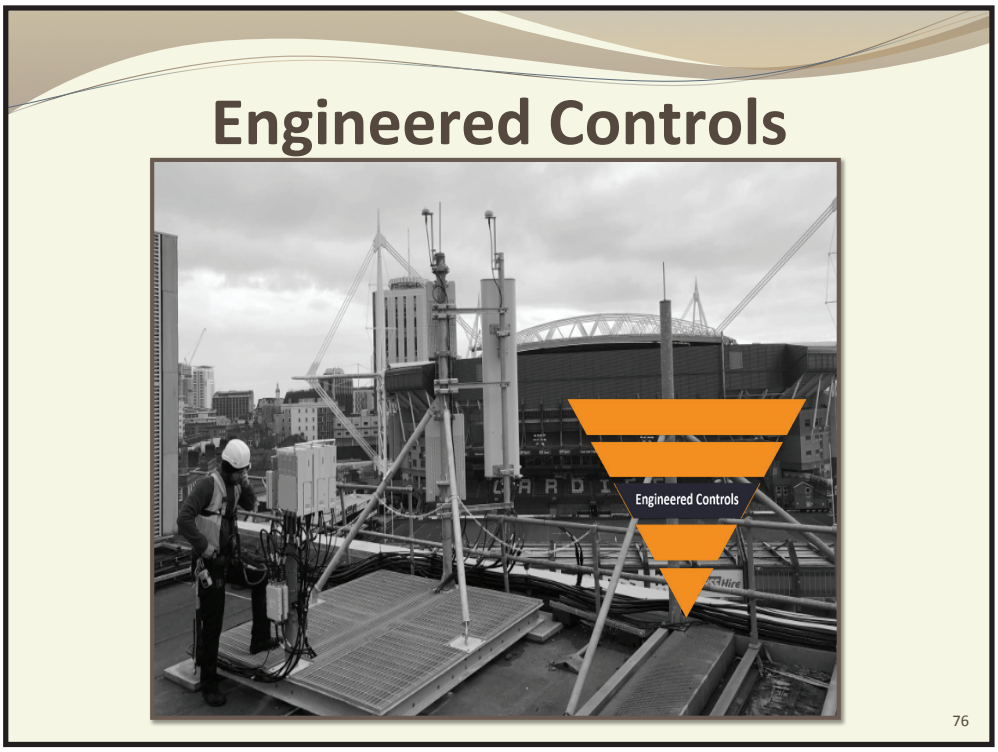
Hierarchy of Controls Overview



Personal Protective Equipment (PPE)

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Section 5

Review Questions

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Hierarchy of Controls Overview

What Hierarchy of Controls is the most desirable solution for reducing hazards but often difficult to achieve?

A. Engineered controls

B. Personal Protective Equipment (PPE)

C. Elimination

D. Substitution

80

What Hierarchy of Controls is the least desirable solution for reducing hazards but often utilized because other controls are not possible?

A. Administrative controls

B. Elimination

C. Personal Protective Equipment (PPE)

D. Engineered controls

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Hierarchy of Controls Overview

If a hazard cannot be eliminated what is the next best Hierarchy of Control?

A. Personal Protective Equipment (PPE)

B. Administrative controls

C. Engineered controls

D. Substitution

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NOTES:

Pre-Task Planning and Job Hazard Assessment

Section 6

Pre-Task Planning and Job Hazard Assessment

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Pre-Task Planning and Job Hazard Assessment

This section is designed to enhance awareness of rooftop hazards. A thorough process to define work scope, recognize and document hazards, and develop mitigation measures through pre-task planning and job hazard assessment is the foundation of safe work on rooftops.

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Pre-Task Planning

Pre-task planning includes but is not limited to the following categories:

- Scope of Work
- Job Hazard Assessment (JHA)
- Pre-Job Meeting
- Multi-Employer Worksite
- Competent Person
- Emergency Information
- Rescue Plan (Site Specific)
- Training

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Scope of Work

The scope of work is broken down into specific tasks, materials, required equipment, and tools.

As each component is identified, lists can be made of the known and possible hazards and exposures associated with each respective task.

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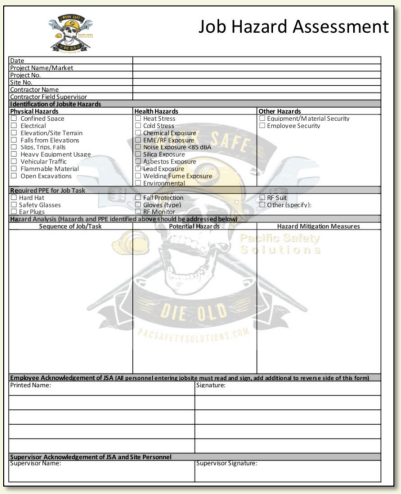
Pre-Task Planning and Job Hazard Assessment

Job Hazard Assessment

- A Job Hazard Assessment must be conducted to address the potential hazards and methods to mitigate those hazards.
- A hazard assessment must be updated daily or whenever the tasks and hazards change during the construction process.



Job Hazard Assessment

Date	
Project Name/Market	
Project No.	
Site No.	
Contractor Name	
Contractor Field Supervisor	

Identification of Jobsite Hazards

Physical Hazards	Health Hazards	Other Hazards
☐ Confined Space	☐ Heat Stress	☐ Equipment/Material Security
☐ Electrical	☐ Cold Stress	☐ Employee Security
☐ Elevation/Site Terrain	☐ Chemical Exposure	
☐ Falls from Elevations	☐ EMF/RF Exposure	
☐ Silos, Trnps, Falls	☐ Noise Exposure <85 dBA	
☐ Heavy Equipment Usage	☐ Silica Exposure	
☐ Vehicular Traffic	☐ Asbestos Exposure	
☐ Flammable Material	☐ Lead Exposure	
☐ Open Excavations	☐ Welding Fume Exposure	
	☐ Environmental	

Required PPE for Job Task

☐ Hard Hat	☐ Fall Protection	☐ RF Suit
☐ Safety Glasses	☐ Gloves (Type)	☐ Other (specify):
☐ Ear Plugs	☐ RF Monitor	

Hazard Analysis (Hazards and PPE identified above should be addressed below)

Sequence of Job/Task	Potential Hazards	Hazard Mitigation Measures

Employee Acknowledgement of JSA (All personnel entering jobsite must read and sign, add additional to reverse side of this form)

Printed Name:	Signature:

Supervisor Acknowledgement of JSA and Site Personnel

Supervisor Name:	Supervisor Signature:

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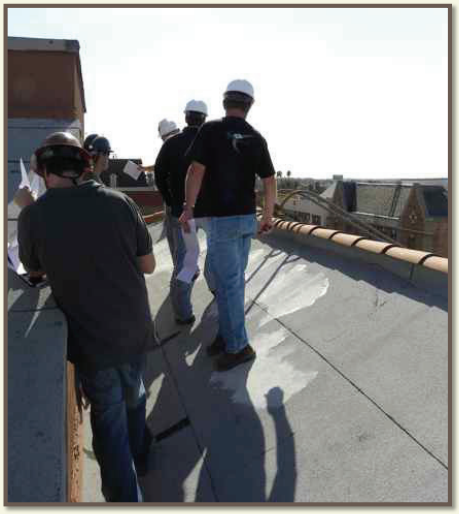
Pre-Job Meeting



- There should be an initial meeting between as many of the involved parties as possible, including but not limited to:
  - Building owner
  - Engineer
  - General contractor and lower tier sub-contractor(s)
- In this initial meeting, the attendees shall designate and/or verify each party's role and responsibilities.

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Multi-Employer Work Site

On multi-employer worksites, all employers must work together to identify and control hazards to meet OSHA regulations and applicable ANSI standards for employee health and safety.

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Competent Person

There must be a competent person on site when any work is being performed by the contractor's employees or contractor's lower tier subcontractor.

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Pre-Task Planning and Job Hazard Assessment

Rescue Plan (Site Specific)

Each employer must have a documented site-specific rescue plan.

The site-specific plan must identify those employees that are designated by the employer to provide first aid, CPR, and rescue.

Site Specific Rescue Plan

Date:		Job Number:	
Site Name:		Site Supervisor:	

Work is taking place at an elevated location and a rescue plan is necessary.	☐ Yes ☐ No
The rescue plan is good for the complete job.	☐ Yes ☐ No

Type of Structure

☐ Monopole ☐ Self Support Tower ☐ Guyed ☐ Rooftop ☐ Water Tank ☐ Other

Method(s) Used To Rescue A Fallen Climber

Manual Rope Rescue ☐ Capstan Hoist ☐ Base Mounted Hoist ☐

Crane/Boom Truck ☐ Bucket Truck ☐ Aerial Lift Equipment ☐

Check List

The Emergency Data Sheet is filled out and posted?	☐ Yes ☐ No
The Job Safety Analysis is complete and on-site?	☐ Yes ☐ No
The appropriate First Aid individuals are on-site?	☐ Yes ☐ No
The appropriate Rescue individuals are on-site?	☐ Yes ☐ No
The appropriate Rescue Equipment is on-site for the rescue plan.	☐ Yes ☐ No
If there are any special obstructions or conditions that need to be discussed, ensure you document them in the comments.	☐ Yes ☐ No
Once the rescue plan is made, the equipment for the plan shall be inspected to ensure it is on-site and in proper working condition.	☐ Yes ☐ No

Descriptive Comments

Reminders

1. Remain calm. 2. Call EMS first. 3. Assess the person's medical condition. 4. Do not become the victim. 5. Secure the site of any other hazards. 6. Contact the office as soon as possible.

Employee's Name (Print)	Rescue Trained	Employee's Initials
	☐ Yes ☐ No	
	☐ Yes ☐ No	
	☐ Yes ☐ No	
	☐ Yes ☐ No	
	☐ Yes ☐ No	
	☐ Yes ☐ No	

All employees on-site must be part of the rescue plan discussion, and the rescue plan shall stay on-site for the duration of the job. On completion of the job, this form shall be put in the job file.

Competent Person Signature

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Training

It is the employer's responsibility to have a program in place ensuring all employees are appropriately trained to perform their expected tasks and recognize hazards that may be encountered.

It is the responsibility of the employer and competent person to ensure that each employee is properly and adequately trained to perform the tasks required of them.

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Emergency Information

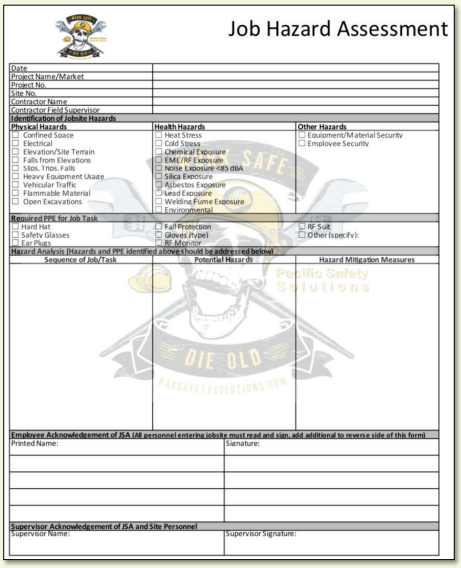
The competent person must ensure site specific emergency information is readily accessible to the entire crew.

All information must be verified prior to commencement of work.

Emergency Data Sheet			
SITE NAME:			
Job Number:			
SITE Latitude & Longitude:			
AMBULANCE #:			
FIRE DEPT #:			
POLICE #:			
R S& QA Name:			
R S&QA Phone Number			
Branch Office #:			
Site Address:			
Hospital Address			
Hospital #:			
Hospital Longitude & Latitude:			
Hospital/EMS Verification:	☐ Yes	Date:	
* Some facilities do not accept emergency calls so as a result all facilities with an older confirmation than 3 years must be confirmed before work starts. When facilities are confirmed, the date, address and phone number must be added to the database.			
Directions for EMS crews to the Site:			
Directions from the Site to the Medical Facility:			

93

Job Hazard Assessment Form



Job Hazard Assessment

Date	
Project Name/Market	
Project No.	
Site No.	
Contractor Name	
Contractor Field Supervisor	

Identification of Jobsite Hazards

Physical Hazards	Health Hazards	Other Hazards
☐ Confined Space	☐ Heat Stress	☐ Equipment/Material Security
☐ Electrical	☐ Cold Stress	☐ Employee Security
☐ Elevation/Site Terrain	☐ Chemical Exposure	
☐ Falls from Elevations	☐ EME/RF Exposure	
☐ Silos, Trips, Falls	☐ Noise Exposure <85 dBA	
☐ Heavy Equipment Usage	☐ Silica Exposure	
☐ Vehicular Traffic	☐ Asbestos Exposure	
☐ Flammable Material	☐ Lead Exposure	
☐ Open Excavations	☐ Welding Fume Exposure	
	☐ Environmental	

Required PPE for Job Task

☐ Hard Hat	☐ Fall Protection	☐ RF Suit
☐ Safety Glasses	☐ Gloves (Type)	☐ Other (specify):
☐ Ear Plugs	☐ RF Monitor	

Hazard Analysis (Hazards and PPE identified above should be addressed below)

Sequence of Job/Task	Potential Hazards	Hazard Mitigation Measures

Employee Acknowledgement of JSA (All personnel entering jobsite must read and sign, add additional to reverse side of this form)

Printed Name:	Signature:

Supervisor Acknowledgement of JSA and Site Personnel

Supervisor Name:	Supervisor Signature:

94

Pre-Task Planning and Job Hazard Assessment

Job Hazard Assessment Tasks

Scope: Break the Job Down Into Tasks

- Describe each task in detail.
- Break down the task into a sequence of steps.
- Describe what work is being done and what materials and tools are being used.

95

Job Hazard Assessment

Sequence of Job/Task: Break the Job Down Into Steps

Sequence of Job/Task	Potential Hazards	Hazard Mitigation Measures

96

Job Hazard Assessment

Identify Potential Hazards and Causes of Injuries and Incidents

- When describing predictable hazards; document those produced by the environment, design of the rooftop, and those connected with the task.
- Document predictable causes of incidents or injuries.

97

Job Hazard Assessment

Identify Potential Hazards and Causes of Injuries and Incidents

Sequence of Job/Task	Potential Hazards	Hazard Mitigation Measures

98

Pre-Task Planning and Job Hazard Assessment

Job Hazard Assessment

Develop Mitigation Measures

- Develop recommended safe job procedures to prevent the occurrence of injuries/incidents.
- Prescribe appropriate engineering, administrative, and work practice controls, and any appropriate PPE to mitigate hazards.

99

Hazard Mitigation Measures

Develop Mitigation Measures

Sequence of Job/Task	Potential Hazards	Hazard Mitigation Measures

100

Job Hazard Assessment Example

Sequence of Job/Task	Potential Hazards	Hazard Mitigation Measures
Removing coax from existing cable tray	Fall hazard	1. Maintain good housekeeping 2. Install temporary guardrails along the unprotected edge on Alpha sector 3. Install warning line 15' from unprotected edge on Beta and Gamma sectors

101

Job Hazard Assessment

- A JHA is used to communicate the job tasks, hazards of the work tasks and control measures to:
  - Crewmembers
  - Subcontractors
  - Customers
  - Inspectors
- The JHA must be reviewed by affected employees:
  - Before commencement of work each day.
  - When subcontractor arrives.
  - When inspector arrives.
  - When customer representative arrives.
  - When conditions change.
  - When work conditions deviate from the original scope.
  - When an unidentified hazard surfaces.

102

Section 6

Review Questions

103

The _____ is part of your rooftop work pre-task planning which must be conducted to detail work scope, identify potential hazards, and develop mitigation and control measures for those hazards.

A. Site emergency information
B. Job Hazard Assessment
C. Training records
D. Pre-job meeting

104

Pre-task planning prior to work on a rooftop is designed to _____ rooftop hazards.

A. Decrease in the severity of
B. Enhance awareness of
C. Eliminate all
D. Reduce PPE needed for

105

A competent person:

A. Is required at every site
B. Is able to identify predictable hazards
C. Has authority to take immediate action
D. All of the above

106

Radio Frequency (RF) Hazards and Mitigation

Section 7

Radio Frequency (RF) Hazards and Mitigation

107

Five Basic Components of Wireless Site Compliance

- Access Management
- "RF" Awareness Training
- Hazard Identification
- Site Policies for Worker Safety
- RF Mitigation Measures

108

Physical Hazard

Because **RF (Radio Frequency)** energy is recognized as a ***Physical hazard***, you must consider both the worker's and the public's exposure when planning operations at communications sites, or for that matter, any location where RF energy may be present.

(Some states list it in their Hazcom standards)

109

OSHA 1910.1020 (c)(13)

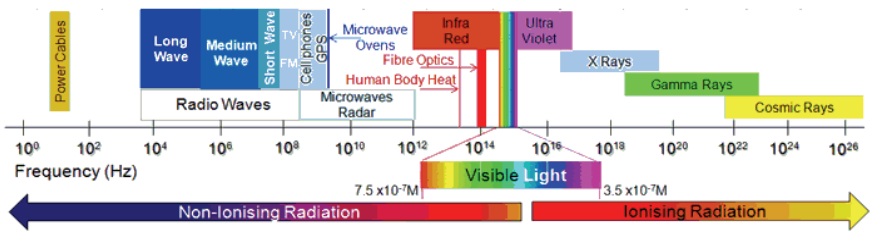
"Toxic substance or harmful physical agent" means any chemical substance, biological agent, or physical stress (noise, heat, cold, vibration, repetitive motion, ionizing, and non-ionizing radiation).

110

Radio Frequency (RF) Hazards and Mitigation

What is Non-Ionizing Radiation?

Non-ionizing radiation is described as a series of energy waves composed of oscillating electric and magnetic fields traveling at the speed of light.

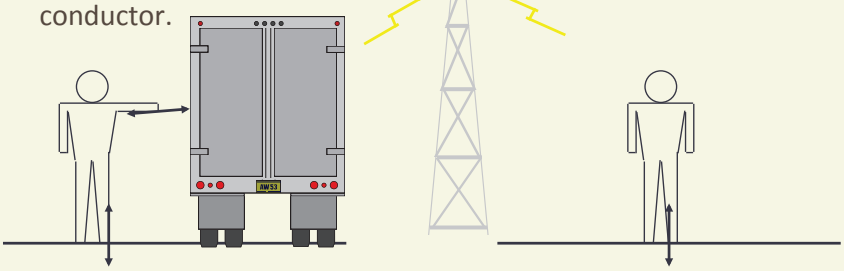


111

Induced and Contact Currents

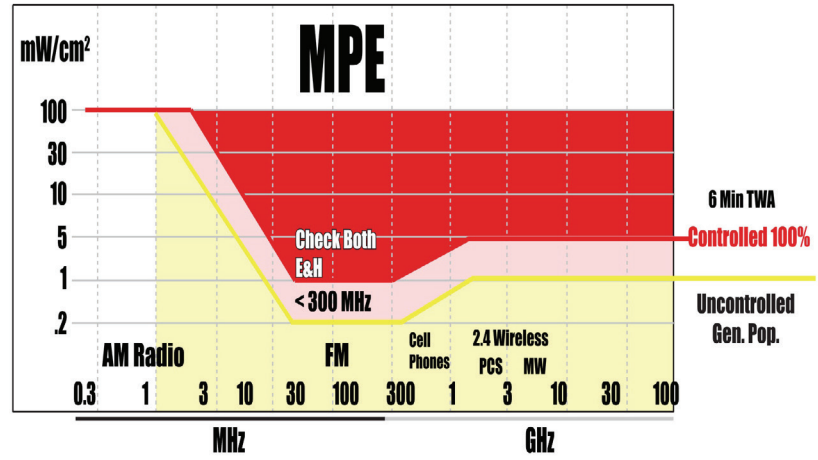
Two Scenarios:

- RF induces voltage in ungrounded conductor.
- Person acts as current path to ground by touching charged conductor.
- RF induces voltage flow in person.
- Current flows to ground.



112

FCC Maximum Permissible Exposure (MPE) Rule



113

General Population/Uncontrolled Exposure Level - Not Trained

Applies to situations in which the public may be exposed or persons who are exposed as a part of their employment (workers).

They may have not been made fully aware of the potential for exposure or cannot exercise control over their exposure.

114

Radio Frequency (RF) Hazards and Mitigation

Controlled Exposure

Controlled Environments: locations where there is exposure that may be incurred by persons who are made **"fully aware"** of the potential for exposure **and can exercise control** over their exposure.

115

Antenna Identification

- Antenna identification is a critical part of assessing RF hazards.
- Different antennas radiate varying frequencies and power levels.
- High power broadcast antennas for FM radio and TV are often the most dangerous.
  - These antennas operate at frequencies that will heat body tissue and they operate at very high levels of power.

116

Radio Frequency (RF) Hazards and Mitigation

117

Radiation Risks

Non-Ionizing Radiation

RF energy that only causes vibrations or oscillations of the atoms which result in **heat** but do not strip electrons from atoms.

Ionizing Radiation

Which is much higher in **frequency** and with energy to cause electrons to be stripped from atoms "ionizing" the atom and changing its characteristics.

The person's tissue is no longer as it was.

118

Radio Frequency (RF) Hazards and Mitigation

Thermal Health Effects

The main effect of RF is **Heating.**

Other affected areas include:

- Skin
- Eyes
- Body Parts
- Whole Body

Symptoms that may occur:

- Blurred Vision
- Confused Behavior
- Dizziness or Vertigo
- Headaches
- Metallic Taste
- Nausea
- Sore Joints

119

Body Heating

- RF overexposure could heat jewelry and metal on clothing.
- It could affect medical implanted devices.

120

Electromagnetic Energy Exposure (EME)

EME exposure is **non-accumulative,** if exposure is kept below the body heating damage range and the 6 minute time limit.

This means EME exposure does not build up in the body the way ionizing radiation can.

Depending on frequency, the ability of RF energy to heat varies greatly. Even in the cases of severe exposure to high energy levels, if the individual **removes him or herself** from the RF environment, the human body which is an excellent "radiator" **will cool itself** through biological processes in a short period of time.

121

RF Hot Spots

When working at a site, attention should be given to the possibility that conductive objects may distort RF fields in their vicinity even though they are not actively energized by a transmitter and may produce RF hot spots exceeding the MPE's and may have possible high current.

Many sources of RF fields may exist in the form of **metallic structures** found near active RF sources that can **reflect and scatter fields** into areas not anticipated.

122

Radio Frequency (RF) Hazards and Mitigation

Induced Current

Has a strong potential to induce electrical current in nearby conductive or metal objects.

NOTE: The tower could also be a mile or more from your site.

123

Crane is close to an AM tower, when they lowered the hook and it got to a certain point the trolley took off, goes to the end of the boom and hits the e-stop. The operator does not know what was wrong but found the trolley contacts welded closed. They fix them and start up again, lower the hook, the trolley takes off and goes to the end of the boom.

When the cables get to a point they resonate with the AM station the crane has an induced current strong enough to weld the contacts together. The crane actually becomes a passive repeater.

124

Controlled Limits

Time Weighted Average

Are based on 6 minute time averages

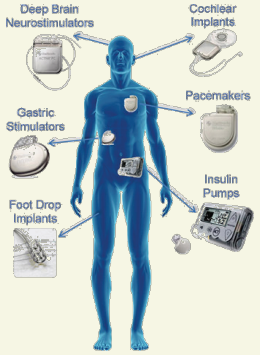
"Controlled" Exposure is when someone is in an area with 100% MPE for 6 minutes

TWA or Excursions above the controlled limits are allowed if 6 minute average is within limits.
(i.e. 200% = 3 min; 600% = 1 min, 1200% = 30 sec)

125

Cardiac Pacemakers, Defibrillators, and Drug Delivery Systems

Wireless Implantable Medical Devices



These can exhibit **improper** operation when subjected to RF fields. Devices and systems that are used external to the body can be substantially more susceptible to interference.

For personnel who use electronic medical devices or systems and may need access to areas near RF sources, a request for an evaluation of the potential interference can be referred to the manufacturer for the manufacturer's own evaluation and guidance on electromagnetic compatibility (EMC).

This may require contact with the device manufacturer and/or appropriate regulatory authorities and an evaluation of the RF fields where the subject employee may need access.

It is important to note that device interference may occur at RF field strengths that are substantially less than human exposure limits.

126

Radio Frequency (RF) Hazards and Mitigation

Radio Frequency Safety Plan (RFSP) Controls

- Engineering
  - Shielding, site configuration, barriers
- Administrative
  - Signs, floor markings, work practices, lockout/tagout, time averaging, personal monitors
- PPE
  - Gloves, protective clothing
- Training
  - General awareness, limits, controls, medical devices, over-exposures, electro-explosives, ancillary hazards

127

PPE for RF Safety

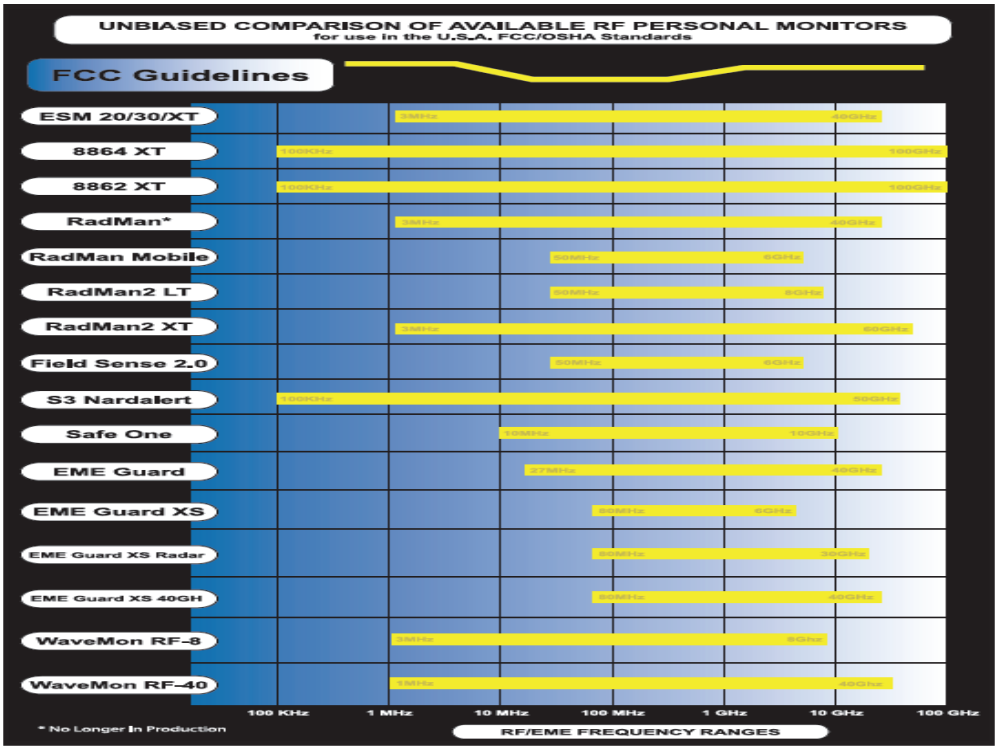
- RF Suits
- Electrically rated hard hats
- High Voltage Gear
  - Arc-Flash
  - HV gloves
  - Hot Sticks/Grounding
  - Flame retardant clothing
  - Eye protection

128

Personal Protection Monitors (PPM)

- Provide Personal Monitoring for areas where RF may be present. (PPM's)
- **Many** are narrow in bandwidth (with limited frequency response) and not fully isotropic (may not be accurate in near field).

129



Radio Frequency (RF) Hazards and Mitigation

Personal Protection Monitors

- Personal monitors can be useful tools.
- Care must be used in selecting a monitor that is **appropriate for the range of potential frequencies** of the exposure fields and which responds appropriately to the RF field.
- In addition, training on appropriate use of personal monitors and their limitations (such as **frequency response and detection angles**) is important if monitors are to be used effectively.

131

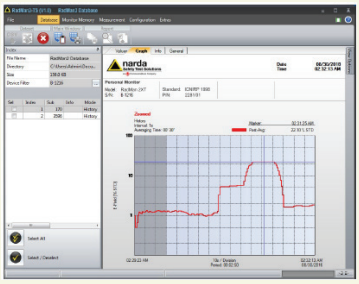
Calibration

Your group must make sure that the RF personal monitors have regular calibration as per the manufacturer requirements.

132

Documentation/Record Keeping

Personal Protection Monitor (PPM) exposure **data must be retained and put in the employees records** anytime an employee is in an area over the controlled standard.



All records should be filed and stored in a manner required by applicable national, federal, state, and/or local regulations and organization policies.

133

RF Site Signage

- Shall use the ANSI symbols and colors.

- Shall be used as an integral part of an overall site compliance plan.
- Be aware of signage as this indicates RF is on the site.

134

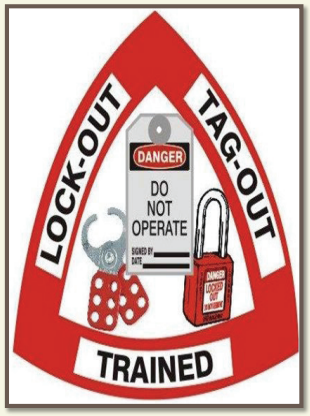
Radio Frequency (RF) Hazards and Mitigation

Which Sign is Correct?

135

Power Down

- Calibrated personal RF monitors can be valuable tools for ascertaining relevant transmitter status.
- Control of power will also require the use of Lock Out, Tag Out (LOTO) procedures.

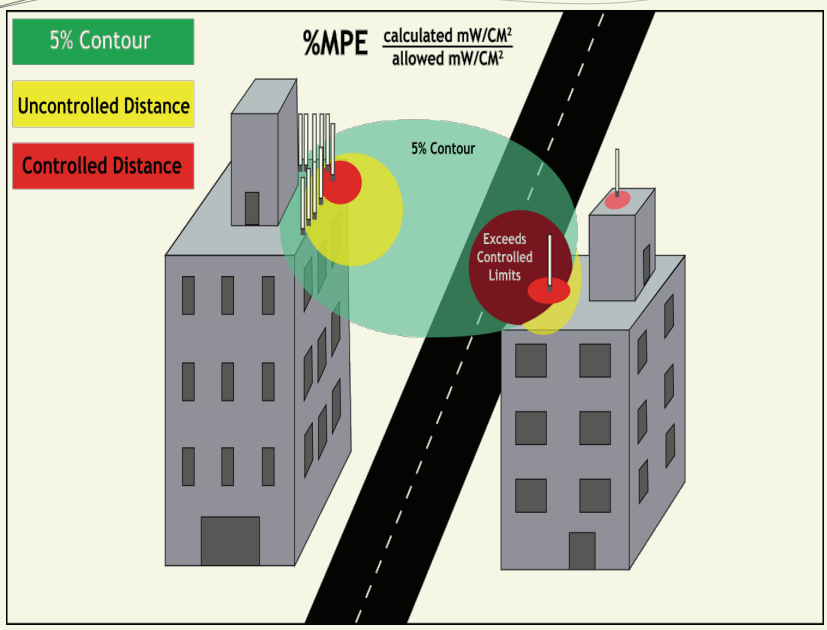


136

Power Down Administrative Controls

Are a crucial aspect of such power reduction schemes; however, **ensuring that the power reduction has, in fact, taken place** prior to personnel entering critical areas and that the **power reduction is maintained** until personnel have left the area.

137



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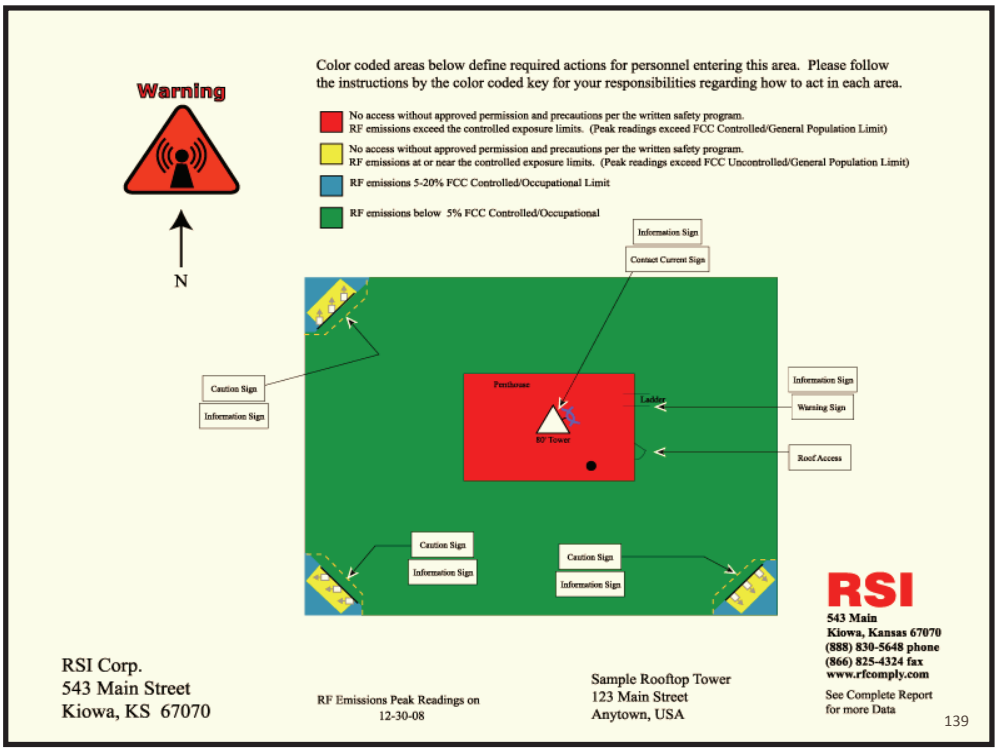
Radio Frequency (RF) Hazards and Mitigation



The Radiofrequency Safety Program (RFSP) Has Several Requirements:

1. An RF Safety Plan
2. Administration/enforcement of the RF Safety Program: RFSP training is the starting point for this requirement
3. RF Training for anyone that could be exposed to RF
4. RF personal protection monitors
5. RF Hazard Assessments: if you are a licensee or site owner
6. RF Signage

140

RF Mitigation Measures

- Elevate antennas
- Reduce power
- Relocate antennas
- Increase distance between antennas
- Install semi-permanent or permanent barriers

141

Section 7

Review Questions

142

Radio Frequency (RF) Hazards and Mitigation

What does MPE stand for?

A. Maximum Permissible Exposure
B. Mean Percentage area
C. Media processing Engine
D. My Phone Explorer

143

What is the main effect of RF overexposure?

A. Heating
B. Burns
C. Flu like symptoms
D. All of the above
E. None of the above

144

What is RF Radiation?

A. Ionizing

B. Non-Ionizing

C. Both

145

Is RF a physical hazard?

A. True

B. False

146

Radio Frequency (RF) Hazards and Mitigation

Does an alarm by the RF personal monitor always have priority over posted signage?

A. Yes

B. No

C. Only on a rooftop site

D. Only on macro cell sites

147

NOTES:

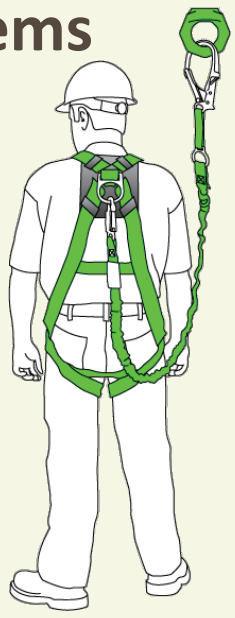
Section 8

Fall Protection

148

Fall Protection Systems

- Should be based on the work environment, resources, the task at hand, as well as identified and potential hazards.
- Shall be compliant with applicable regulations, standards, and original equipment manufacturer's recommendations.
- Individuals installing, utilizing, and maintaining fall protection systems must be adequately trained.

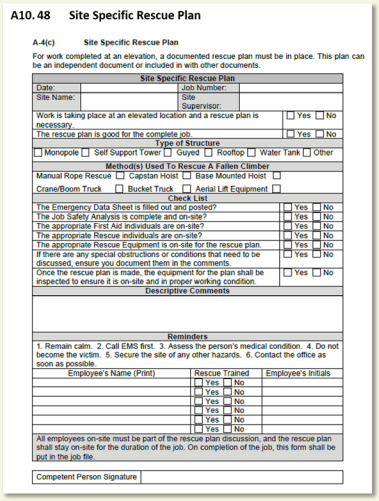


149

Fall Protection

Site Specific

- A site-specific fall protection and rescue plan shall be written by a qualified person, documented, and adhered to.
- If any changes are made while on site, those changes must be documented on the appropriate plan.



A10. 48 Site Specific Rescue Plan

A-4(c) Site Specific Rescue Plan

For work completed at an elevation, a documented rescue plan must be in place. This plan can be an independent document or included in with other documents.

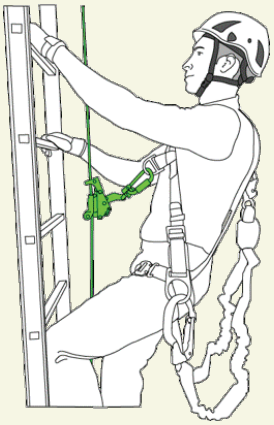
Site Specific Rescue Plan			
Date:		Job Number:	
Site Name:		Site Supervisor:	
Work is taking place at an elevated location and a rescue plan is necessary.			☐ Yes ☐ No
The rescue plan is good for the complete job.			☐ Yes ☐ No
Type of Structure			
☐ Monopole ☐ Self Support Tower ☐ Guyed ☐ Rooftop ☐ Water Tank ☐ Other			
Method(s) Used To Rescue A Fallen Climber			
Manual Rope Rescue ☐ Capstan Hoist ☐ Base Mounted Hoist ☐			
Crane/Boom Truck ☐ Bucket Truck ☐ Aerial Lift Equipment ☐			
Check List			
The Emergency Data Sheet is filled out and posted?			☐ Yes ☐ No
The Job Safety Analysis is complete and on-site?			☐ Yes ☐ No
The appropriate First Aid individuals are on-site?			☐ Yes ☐ No
The appropriate Rescue individuals are on-site?			☐ Yes ☐ No
The appropriate Rescue Equipment is on-site for the rescue plan.			☐ Yes ☐ No
If there are any special obstructions or conditions that need to be discussed, ensure you document them in the comments.			☐ Yes ☐ No
Once the rescue plan is made, the equipment for the plan shall be inspected to ensure it is on-site and in proper working condition.			☐ Yes ☐ No
Descriptive Comments			
Reminders			
1. Remain calm. 2. Call EMS first. 3. Assess the person's medical condition. 4. Do not become the victim. 5. Secure the site of any other hazards. 6. Contact the office as soon as possible.			
Employee's Name (Print)		Rescue Trained	Employee's Initials
		☐ Yes ☐ No	
		☐ Yes ☐ No	
		☐ Yes ☐ No	
		☐ Yes ☐ No	
		☐ Yes ☐ No	
		☐ Yes ☐ No	
All employees on-site must be part of the rescue plan discussion, and the rescue plan shall stay on-site for the duration of the job. On completion of the job, this form shall be put in the job file.			
Competent Person Signature			

150

Individual Identification

Individuals following a site-specific fall protection and rescue plan shall be identified as such:

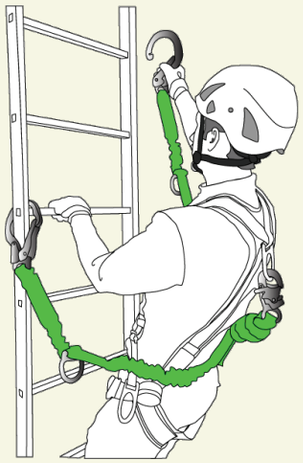
- **Authorized Person:**
  - Demonstrates physical capabilities to perform tasks at height
  - Can identify hazards
  - Can inspect equipment
  - **Must** be supervised by a competent person
  - Should an individual be climbing a structure, authorized climber designation must be **required**.



151

Individual Identification

- **Competent Person:**
  - Ensure fall protection plan and rescue plans are followed and reviewed with personnel on site.
  - Equipment is compliant and fit for purpose and inspected prior to each use.
  - Ensure supervision responsibilities are fulfilled.
  - Should an individual be climbing a structure, competent climber designation must be **required**.



152

Individual Identification

- **Qualified Person:**
  - An individual who possesses a recognized degree, certificate, or through outstanding professional experience, can demonstrate the ability to solve or resolve problems relating to the subject matter, the work, or the project.

153

Fall Protection

Hierarchy of Fall Protection

154

Elimination

- **Safest form of fall protection**
  - Passive – does not require action / application
  - Completely removes the fall hazard
  - Most effective hazard control
  - Not always possible

155

Guardrails and Parapet

- **Guardrails**
  - Top rails: 42 inches plus or minus 3 inches.
  - Mid-rails: Height midway.
  - Guardrail systems must be capable of withstanding a force of at least 200 pounds.
  - When guardrail systems are used at hoisting areas, a chain, gate, or removable guardrail section must be placed across the access opening between guardrail sections during those times when hoisting operations are not taking place.
- **Parapet**
  - Minimum height requirement: 39 inches.

156

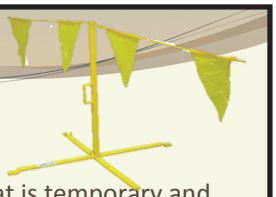
Barriers and Covers

- **Barriers and Covers**
  - Covers shall be strong enough to hold twice the intended force that will be applied.
  - Secured when installed.
  - Color coded or marked “hole” or “cover.”
  - Reference 1926.501(i).

157

Fall Protection

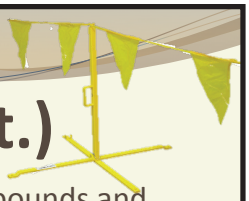
Warning Lines



- Erected not less than 6' from the roof edge for work that is temporary and infrequent, or not less than 15' for other work – low slope roof only (less than 4:12)
- Warning lines shall consist of ropes, wires, or chains, and supporting stanchions erected as follows:
  - Shall be flagged at not more than 6 foot intervals with high-visibility material.
  - Shall be rigged and supported in such a way that its lowest point (including sag) is no less than 34 inches from the walking/working surface and its highest point is no more than 39 inches from the walking/working surface.
  - After being erected, shall be capable of resisting, without tipping over, a force of at least 16 pounds applied horizontally against the stanchion, 30 inches above the walking/working surface, perpendicular to the warning line, and in the direction of the floor, roof, or platform edge.

158

Warning Lines (cont.)



- Shall have a minimum tensile strength of 500 pounds and after being attached to the stanchions, shall be capable of supporting, without breaking, the loads applied to the stanchions.
  - The line shall be attached at each stanchion in such a way that pulling on one section of the line between stanchions will not result in slack being taken up in adjacent sections before the stanchion tips over.
  - If there are any changes to the work environment (need to work outside a warning line) the hierarchy of fall protection controls should be assessed for the best solution.

159

Fall Protection - Administrative

Passive System

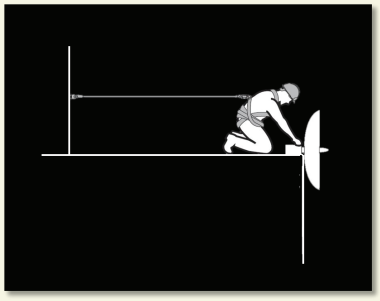
Administrative fall protection

"Employer mandated safe work practices or procedures that are designed to prevent exposure to a fall by signaling or warning an authorized person to avoid approaching a fall hazard." – *ANSI Z359.0*

160

Fall Restraint

- Eliminates the possibility of falling to the lower level
  - Isolates worker from fall hazards if installed properly
  - Maximum fall distance - **ZERO**



161

Fall Restraint (cont.)

- Anchor requirements: must 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. ANSI Z359 requirement is 1,000 pounds or 4 times the maximum intended load.
  - Anchor Types
    - Engineered/Certified
    - Improvised

162

Fall Restraint Equipment

- Equipment required:
  - Synthetic rope
  - Carabiners
  - Anchorage straps if using improvised anchor
  - Positive stop device (rope grab)
  - Restraint belt or full body harness

163

Control Descent

- Justification
- Proposed anchor points
- Rope types
- Rigging overview
- Descent hardware

164

Control Descent (cont.)

- Rope abrasion protection
- Secondary systems
- Edge negotiation
- Rescue plan
- Training

165

Fall Protection

Limited Fall Arrest

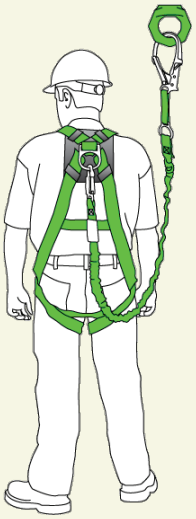
- **Limits maximum free fall distance – 2 feet**
  (primarily upper sternum attachment)
  - Active
  - Ladder safe-climb system
    - Cable
    - Rail

166

Fall Arrest

ABC's:

- Anchor
- Body Harness
- Connector
- Lifeline or
- PEA Lanyard



Capacity 130 to 310 lbs.
OSHA standards allow for capacities to exceed 310 lbs. as long as the manufacturer ensures that their products will provide the proper protection for the weight listed.

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Fall Arrest (cont.)

- **Most dangerous method of fall protection**
  - At risk of injury during a fall
    - Forces on the body - Maximum Arresting Force (MAF) allowed by OSHA = 1,800 lbs.
      - ANSI – 900 lbs.
    - Swing fall
  - At risk of injury after a fall
    - Possibility of suspension out of reach
    - Medical concerns

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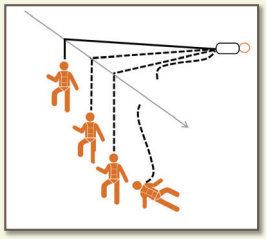
Fall Arrest: Self-Retracting Devices

Maximum Arrest Distance
(comparable to deceleration distance)

- **Class A**
  - 24” Max. Arrest Distance.
  - Average Arresting Force 1,350 lbs.
  - Peak Arresting Force Not To Exceed 1,800 lbs.
- **Class B**
  - 56” Max. Arrest Distance
  - Average Arresting Force 900 lbs.
  - Peak Arresting Force Not To Exceed 1,800 lbs.
- **SRL-LE (Leading Edge)**
  - The energy absorber ANSI/ASSE Z359.13.



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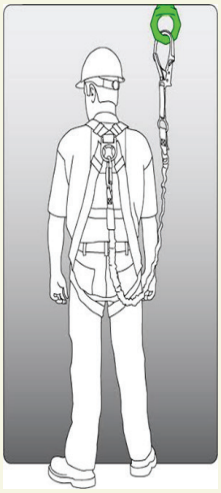
Fall Protection

Fall Arrest

- **Anchorage** – Structure to which equipment is attached
  - **Types**
    - Certified Anchors
    - Improvised Anchors



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Certified Anchors

- Engineered by a qualified person
- Eliminates worker assessment – "human error"
- Must be at least 2 times the Maximum Arresting Force (MAF) of 1,800 lbs.
  - A 2:1 calculation equals **3,600 lbs.**

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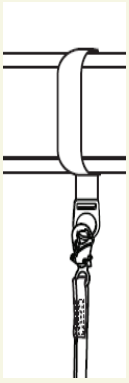
Improvised Anchors

- Workers MUST have an overwhelming evidence of strength when identifying a structure
- Assessed to be **5,000 lbs.** or greater
- Greatest potential for human error



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Section 8

Review Questions

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Fall Protection

According to ANSI, what is the maximum allowable free fall distance for limited fall arrest?

A. 2 ft.

B. 3 ft.

C. 4 ft.

D. 6 ft.

E. 18 in.

174

According to OSHA, what is the recommended maximum weight of a worker and their tools?

A. 220 lbs.

B. 310 lbs.

C. 350 lbs.

D. 480 lbs.

175

According to OSHA, personal fall arrest systems shall limit the maximum arresting force on an employee to how many pounds?

A. 900 lbs.

B. 1,350 lbs.

C. 1,800 lbs.

D. 3,600 lbs.

176

What is the minimum strength assessment for an "Improvised" anchor?

A. 1,800 lbs.

B. 3,100 lbs.

C. 3,600 lbs.

D. 5,000 lbs.

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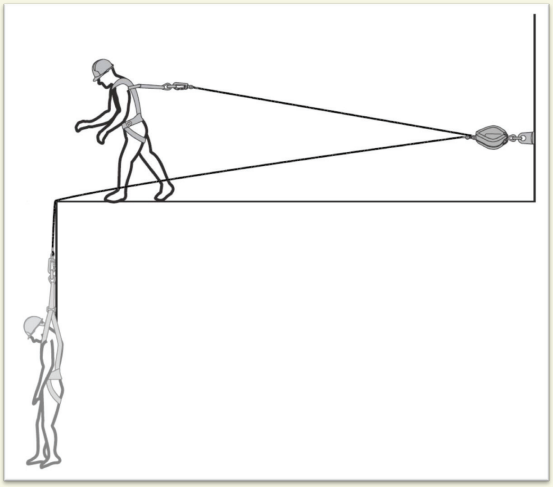
Fall Protection

What is the drawing demonstrating?

A. Fall arrest

B. Fall restraint



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NOTES:

Section 9

Practical Workshop

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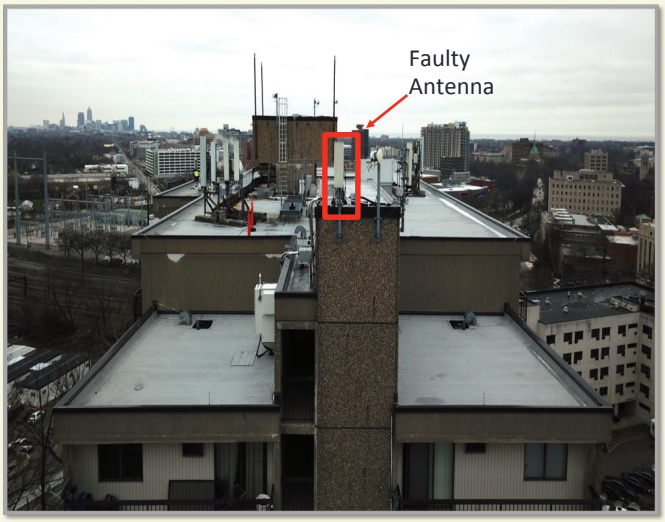
Falls From Elevation Unprotected Edges
Example 1



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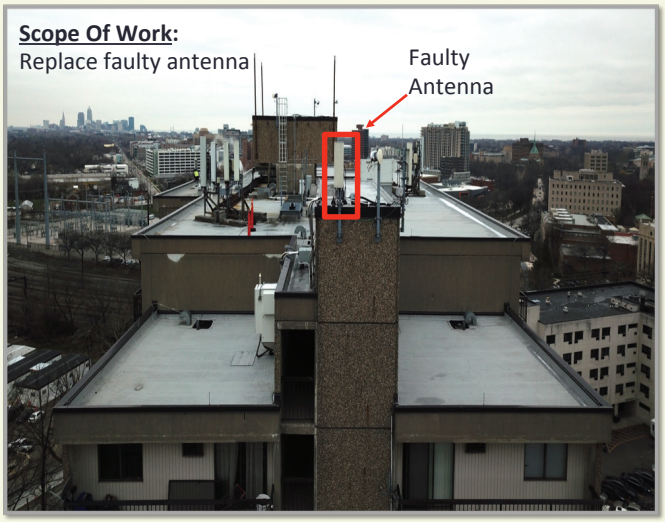
Practical Workshop

Falls From Elevation Unprotected Edges

Example 1: Scope of Work



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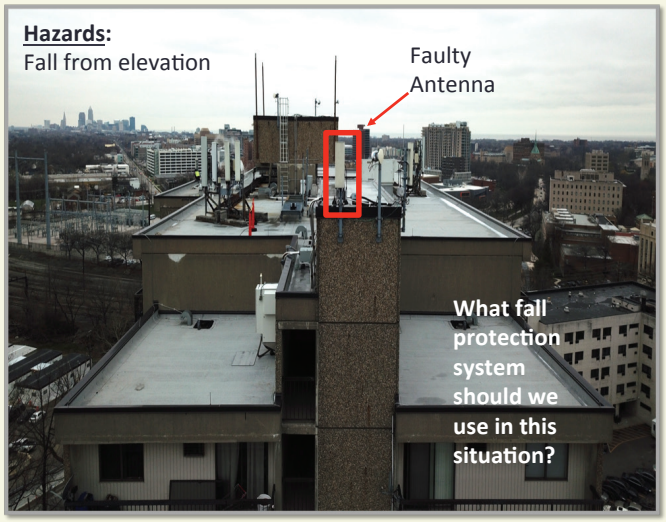
Falls From Elevation Unprotected Edges

Example 1: Hazards



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Falls From Elevation Unprotected Edges Example 2

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Falls From Elevation Unprotected Edges Example 2: Scope of Work

Scope Of Work:
Replace RRU

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Practical Workshop

Falls From Elevation Unprotected Edges Example 2: Hazards

Hazards:
Fall from elevation

What fall protection system should we use in this situation?

185

Fall Restraint Demonstration

- Anchor point
- Body holding device
- Fall restraint system
- How to use fall restraint system
- Limitations
- Compatibility

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NOTES:

APPENDIX

References

ANSI/ASSE A10.48, Criteria for Safety Practices with the Construction, Demolition, Modifi cation and Maintenance of Communication Structures

ANSI/ASME B30.10 Hook Inspection

ANSI/ASME B30.30 Ropes

ANSI/IEEE C95.1, Standard for Safety Levels with Respect to Human Exposure to Electric, Magnetic and Electromagnetic Fields, 0 Hz to 300 GHz

ANSI/ISEA 121 Standard for Dropped Objects Prevention Solutions

ANSI/ISEA Z87 Standard for Occupational and Educational Personal Eye and Face Protection Devices

ANSI/ISEA Z89.1 Standard for Industrial Head Protection

ANSI/TIA-222

ANSI/TIA-322, Loading Criteria, Analysis, and Design Related to the Installation, Alteration and Maintenance of Communication Structures

ANSI/ASSE Z490.1, Criteria for Accepted Practices in Safety, Health and Environmental Training

ANSI/ASSE Z359.2, Minimum Requirements for a Comprehensive Managed Fall Protection Program

Federal Communications Commission (FCC), OET Bulletin 56 and 65

IBC – International Building Code (2018 Newest Edition)

ISO 45001: Occupational Heath and Safety Standard

National Association of Tower Erectors (NATE), Tower Climber Fall Protection Training Standard, Third Edition Revised 2013

OSHA 29 CFR 1910, Occupational Safety and Health Standards

OSHA 29 CFR 1926, Safety and Health Regulations for Construction

OSHA Construction Safety and Health Outreach Program U.S. Department of Labor May 1996

OSHA Demolition Factsheet

U.S. Department of Labor Division of Occupational Safety and Health (OSHA)

Other Industry References

ANSI/ASSE A10.5, Material Hoists

ANSI/ASSE A10.6, Safety Requirements for Demolition Operations

ANSI/ASSE A10.28, Work Platforms Suspended from Cranes or Derricks

ANSI/ASSE A10.32, Personal Fall Protection Systems for Construction and Demolition Operations

ANSI/ASSE A10.33, Safety and Health Program Requirements for Multi-Employer Projects

ANSI/ASSE A10.34, Protection of the Public on or Adjacent to Construction Sites

ANSI/ASSE A10.42, Safety Requirements for Rigging Qualifications and Responsibilities

ANSI/ASSE A10.44, Control of Energy Sources (Lockout/Tagout) for Construction & Demolition Operations

ANSI/ASSE Z490.1, Criteria for Accepted Practices in Safety, Health and Environmental Training

AWS D1.1/D1/1M, Structural Welding Code-Steel

Cordage Institute International Guideline - CI 2001-2004: Fiber Rope Inspection and Retirement Criteria

Institute of Electrical and Electronic Engineers (IEEE) C95.1, Standard for Safety Levels with Respect to Human Exposure to Radio Frequency Electromagnetic Fields, 3 kHz to 300 GHz

NFPA 10, Standard for Portable Fire Extinguishers

National Association of Tower Erectors (NATE), Resource Reference for RF Awareness

OSHA Construction Safety and Health Outreach Program U.S. Department of Labor May 1996

OSHA Demolition Factsheet

References

Current OSHA Website specific to telecommunications structures: https://www.google.com/search?q=osha+telecommunications+website&rlz=1C1CHBD_enUS818US818&oq=OSHA&aqs=chrome.3.69i57j69i60j69i59j35i39j0l2.3848j0j4&sourceid=chrome&ie=UTF-8

Reference page for NATE Climber Connection videos and Planning Advisory Notices: https://natehome.com/

Note: ASSE had a name change to ASSP during 2018. The American Society of Safety Engineers officially
changed their name to the American society of Safety Professionals during June of 2018. This name change
did not impact the ANSI (American National Standards Institute) accreditation. The change was intended to ensure that the organization stays at the forefront of workplace safety advancements.

The documents are supported by ASSP but are listed in this reference as ASSE to ensure access to the proper documents until the updates to the various standards occurs.

- **Record Type:** Instruction
- **Directive Number:** CPL 02-00-124
- **Old Directive Number:** CPL 2-0.124
- **Title:** Multi-Employer Citation Policy.
- **Information Date:** 12/10/1999

OSHA INSTRUCTION

U.S. DEPARTMENT OF LABOR Occupational Safety and Health Administration

DIRECTIVE NUMBER: CPL 2-0.124	**EFFECTIVE DATE:** December 10, 1999
SUBJECT: Multi-Employer Citation Policy	

ABSTRACT

Purpose: To Clarify the Agency's multi-employer citation policy

Scope: OSHA-wide

References: OSHA Instruction CPL 2.103 (the FIRM)

Suspensions: Chapter III, Paragraph C. 6. of the FIRM is suspended and replaced by this directive

State Impact: This Instruction describes a Federal Program Change. Notification of State intent is required, but adoption is not.

Action Offices: National, Regional, and Area Offices

Originating Office: Directorate of Compliance Programs

Contact: Carl Sall (202) 693-2345
Directorate of Construction
N3468 FPB
200 Constitution Ave., NW

Washington, DC 20210

By and Under the Authority of
R. Davis Layne
Deputy Assistant Secretary, OSHA

TABLE OF CONTENTS

I. Purpose. This Directive clarifies the Agency's multi-employer citation policy and suspends Chapter III. C. 6. of OSHA's Field Inspection Reference Manual (FIRM).

II. Scope. OSHA-Wide

III. Suspension. Chapter III. Paragraph C. 6. of the FIRM (CPL 2.103) is suspended and replaced by this Directive.

IV. References. OSHA Instructions:

- CPL 02-00.103; OSHA Field Inspection Reference Manual (FIRM), September 26, 1994.
- ADM 08-0.1C, OSHA Electronic Directive System, December 19,1997.

V. Action Information

- A. Responsible Office. Directorate of Construction.
- B. Action Offices. National, Regional and Area Offices
- C. Information Offices. State Plan Offices, Consultation Project Offices

VI. Federal Program Change. This Directive describes a Federal Program Change for which State adoption is not required. However, the States shall respond via the two-way memorandum to the Regional Office as soon as the State's intent regarding the multi-employer citation policy is known, but no later than 60 calendar days after the date of transmittal from the Directorate of Federal-State Operations.

VII. Force and Effect of Revised Policy. The revised policy provided in this Directive is in full force and effect from the date of its issuance. It is an official Agency

policy to be implemented OSHA-wide.

VIII. Changes in Web Version of FIRM. A note will be included at appropriate places in the FIRM as it appears on the Web indicating the suspension of Chapter III paragraph 6. C. and its replacement by this Directive, and a hypertext link will be provided connecting viewers with this Directive.

IX. Background. OSHA's Field Inspection Reference Manual (FIRM) of September 26, 1994 (CPL 2.103), states at Chapter III, paragraph 6. C., the Agency's citation policy for multi-employer worksites. The Agency has determined that this policy needs clarification. This directive describes the revised policy.

A. Continuation of Basic Policy. This revision continues OSHA's existing policy for issuing citations on multi-employer worksites. However, it gives clearer and more detailed guidance than did the earlier description of the policy in the FIRM, including new examples explaining when citations should and should not be issued to exposing, creating, correcting, and controlling employers. These examples, which address common situations and provide general policy guidance, are not intended to be exclusive. In all cases, the decision on whether to issue citations should be based on all of the relevant facts revealed by the inspection or investigation.

B. No Changes in Employer Duties. This revision neither imposes new duties on employers nor detracts from their existing duties under the OSH Act. Those duties continue to arise from the employers' statutory duty to comply with OSHA standards and their duty to exercise reasonable diligence to determine whether violations of those standards exist.

X. Multi-employer Worksite Policy. The following is the multi-employer citation policy:

A. Multi-employer Worksites. On multi-employer worksites (in all industry sectors), more than one employer may be citable for a hazardous condition that violates an OSHA standard. A two-step process must be followed in determining whether more than one employer is to be cited.

1. Step One. The first step is to determine whether the employer is a creating, exposing, correcting, or controlling employer. The definitions in paragraphs (B) - (E) below explain and give examples of each. Remember that an employer may have multiple roles (see paragraph H). Once you determine the role of the employer, go to Step Two to determine if a citation is appropriate (NOTE: only exposing employers can be cited for General Duty Clause violations).

2. Step Two. If the employer falls into one of these categories, it has obligations with respect to OSHA requirements. Step Two is to determine if the employer's actions were sufficient to meet those obligations. The extent of the actions required of employers varies based on which category applies. Note that the extent of the measures that a controlling employer must take to satisfy its duty to exercise reasonable care to prevent and detect violations is less than what is required of an employer with respect to protecting its own employees.

B. The Creating Employer

1. Step 1: Definition: The employer that caused a hazardous condition that violates an OSHA standard.

2. Step 2: Actions Taken: Employers must not create violative conditions. An employer that does so is citable even if the only employees exposed are those of other employers at the site.

a. **Example 1**: Employer Host operates a factory. It contracts with Company S to service machinery. Host fails to cover drums of a chemical despite S's repeated requests that it do so. This results in airborne levels of the chemical that exceed the Permissible Exposure Limit.

Analysis: **Step 1**: Host is a creating employer because it caused employees of S to be exposed to the air contaminant above the PEL. **Step 2**: Host failed to implement measures to prevent the accumulation of the air contaminant. It could have met its OSHA obligation by implementing the simple engineering control of covering the drums. Having failed to implement a feasible engineering control to meet the PEL, Host is citable for the hazard.

b. **Example 2:** Employer M hoists materials onto Floor 8, damaging perimeter guardrails. Neither its own employees nor employees of other employers are exposed to the hazard. It takes effective steps to keep all employees, including those of other employers, away from the unprotected edge and informs the controlling employer of the problem. Employer M lacks authority to fix the guardrails itself.

Analysis: **Step 1:** Employer M is a creating employer because it caused a hazardous condition by damaging the guardrails. **Step 2:** While it lacked the authority to fix the guardrails, it took immediate and effective steps to keep all employees away from the hazard and notified the controlling employer of the hazard. Employer M is not citable since it took effective measures to prevent employee exposure to the fall hazard.

C. The Exposing Employer

1. Step 1: Definition: An employer whose own employees are exposed to the hazard. See Chapter III, section (C)(1)(b) for a discussion of what constitutes exposure.

2. Step 2: Actions taken: If the exposing employer created the violation, it is citable for the violation as a creating employer. If the violation was created by another employer, the exposing employer is citable if it (1) knew of the hazardous condition or failed to exercise reasonable diligence to discover the condition, and (2) failed to take steps consistent with its authority to protect is employees. If the exposing employer has authority to correct the hazard, it must do so. If the exposing employer lacks the authority to correct the hazard, it is citable if it fails to do each of the following: (1) ask the creating and/or controlling employer to correct the hazard; (2) inform its employees of the hazard; and (3) take reasonable

alternative protective measures. In extreme circumstances (e.g., imminent danger situations), the exposing employer is citable for failing to remove its employees from the job to avoid the hazard.

a. **Example 3:** Employer Sub S is responsible for inspecting and cleaning a work area in Plant P around a large, permanent hole at the end of each day. An OSHA standard requires guardrails. There are no guardrails around the hole and Sub S employees do not use personal fall protection, although it would be feasible to do so. Sub S has no authority to install guardrails. However, it did ask Employer P, which operates the plant, to install them. P refused to install guardrails.

Analysis: **Step 1**: Sub S is an exposing employer because its employees are exposed to the fall hazard. **Step 2**: While Sub S has no authority to install guardrails, it is required to comply with OSHA requirements to the extent feasible. It must take steps to protect its employees and ask the employer that controls the hazard - Employer P - to correct it. Although Sub S asked for guardrails, since the hazard was not corrected, Sub S was responsible for taking reasonable alternative protective steps, such as providing personal fall protection. Because that was not done, Sub S is citable for the violation.

b. **Example 4:** Unprotected rebar on either side of an access ramp presents an impalement hazard. Sub E, an electrical subcontractor, does not have the authority to cover the rebar. However, several times Sub E asked the general contractor, Employer GC, to cover the rebar. In the meantime, Sub E instructed its employees to use a different access route that avoided most of the uncovered rebar and required them to keep as far from the rebar as possible.

Analysis: **Step 1**: Since Sub E employees were still exposed to some unprotected rebar, Sub E is an exposing employer. **Step 2**: Sub E made a good faith effort to get the general contractor to correct the hazard and took feasible measures within its control to protect its employees. Sub E is not citable for the rebar hazard.

D. The Correcting Employer

1. Step 1: Definition: An employer who is engaged in a common undertaking, on the same worksite, as the exposing employer and is responsible for correcting a hazard. This usually occurs where an employer is given the responsibility of installing and/or maintaining particular safety/health equipment or devices.

2. Step 2: Actions taken: The correcting employer must exercise reasonable care in preventing and discovering violations and meet its obligations of correcting the hazard.

a. **Example 5:** Employer C, a carpentry contractor, is hired to erect and maintain guardrails throughout a large, 15-story project. Work is proceeding on all floors. C inspects all floors in the morning and again in the afternoon each day. It also inspects areas where material is delivered to the perimeter once the material vendor is finished delivering material to that area. Other subcontractors are required to report damaged/missing guardrails to the general contractor, who forwards those reports to C. C repairs damaged guardrails immediately after finding them and immediately after they are reported. On this project few instances of damaged guardrails have occurred other than where material has been delivered. Shortly after the afternoon inspection of Floor 6, workers moving equipment accidentally damage a guardrail in one area. No one tells C of the damage and C has not seen it. An OSHA inspection occurs at the beginning of the next day, prior to the morning inspection of Floor 6. None of C's own employees are exposed to the hazard, but other employees are exposed.

Analysis: Step 1: C is a correcting employer since it is responsible for erecting and maintaining fall protection equipment. **Step 2:** The steps C implemented to discover and correct damaged guardrails were reasonable in light of the amount of activity and size of the project. It exercised reasonable care in preventing and discovering violations; it is not citable for the damaged guardrail since it could not reasonably have known of the violation.

E. The Controlling Employer

1. Step 1: Definition: An employer who has general supervisory authority over the worksite, including the power to correct safety and health violations itself or require others to correct them. Control can be established by contract or, in the absence of explicit contractual provisions, by the exercise of control in practice. Descriptions and examples of different kinds of controlling employers are given below.

2. Step 2: Actions Taken: A controlling employer must exercise reasonable care to prevent and detect violations on the site. The extent of the measures that a controlling employer must implement to satisfy this duty of reasonable care is less than what is required of an employer with respect to protecting its own employees. This means that the controlling employer is not normally required to inspect for hazards as frequently or to have the same level of knowledge of the applicable standards or of trade expertise as the employer it has hired.

3. Factors Relating to Reasonable Care Standard. Factors that affect how frequently and closely a controlling employer must inspect to meet its standard of reasonable care include:

a. The scale of the project;

b. The nature and pace of the work, including the frequency with which the number or types of hazards change as the work progresses;

c. How much the controlling employer knows both about the safety history and safety practices of the employer it controls and about that employer's level of expertise.

d. More frequent inspections are normally needed if the controlling employer knows that the other employer has a history of non-compliance. Greater inspection frequency may also be needed, especially at the beginning of the project, if the controlling employer had never before worked with this other employer and does not know its compliance history.

e. Less frequent inspections may be appropriate where the controlling employer sees strong indications that the other employer has implemented effective safety and health efforts. The most important indicator of an effective safety and health effort by the other employer is a consistently high level of compliance. Other indicators include the use of an effective, graduated system of enforcement for non-compliance with safety and health requirements coupled with regular jobsite safety meetings and safety training.

4. Evaluating Reasonable Care. In evaluating whether a controlling employer has exercised reasonable care in preventing and discovering violations, consider questions such as whether the controlling employer:

   a. Conducted periodic inspections of appropriate frequency (frequency should be based on the factors listed in G.3.);

   b. Implemented an effective system for promptly correcting hazards;

   c. Enforces the other employer's compliance with safety and health requirements with an effective, graduated system of enforcement and follow-up inspections.

5. Types of Controlling Employers

   a. Control Established by Contract. In this case, **the Employer Has a Specific Contract Right to Control Safety**: To be a controlling employer, the employer must itself be able to prevent or correct a violation or to require another employer to prevent or correct the violation. One source of this ability is explicit contract authority. This can take the form of a specific contract right to require another employer to adhere to safety and health requirements and to correct violations the controlling employer discovers.

   (1) **Example 6**: Employer GH contracts with Employer S to do sandblasting at GH's plant. Some of the work is regularly scheduled maintenance and so is general industry work; other parts of the project involve new work and are considered construction. Respiratory protection is required. Further, the contract explicitly requires S to comply with safety and health requirements. Under the contract GH has the right to take various actions against S for failing to meet contract requirements, including the right to have non-compliance corrected by using other workers and back-charging for that work. S is one of two employers under contract with GH at the work site, where a total of five employees work. All work is done within an existing building. The number and types of hazards involved in S's work do not significantly change as the work progresses. Further, GH has worked with S over the course of several years. S provides periodic and other safety and health training and uses a graduated system of enforcement of safety and health rules. S has consistently had a high level of compliance at its previous jobs and at this site. GH monitors S by a combination of weekly inspections, telephone discussions and a weekly review of S's own inspection reports. GH has a system of graduated enforcement that it has applied to S for the few safety and health violations that had been committed by S in the past few years. Further, due to respirator equipment problems S violates respiratory protection requirements two days before GH's next scheduled inspection of S. The next day there is an OSHA inspection. There is no notation of the equipment problems in S's inspection reports to GH and S made no mention of it in its telephone discussions.

   Analysis: Step 1: GH is a controlling employer because it has general supervisory authority over the worksite, including contractual authority to correct safety and health violations. **Step 2:** GH has taken reasonable steps to try to make sure that S meets safety and health requirements. Its inspection frequency is appropriate in light of the low number of workers at the site, lack of significant changes in the nature of the work and types of hazards involved, GH's knowledge of S's history of compliance and its effective safety and health efforts on this job. GH has exercised reasonable care and is not citable for this condition.

   (2) **Example 7**: Employer GC contracts with Employer P to do painting work. GC has the same contract authority over P as Employer GH had in Example 6. GC has never before worked with P. GC conducts inspections that are sufficiently frequent in light of the factors listed above in (G)(3). Further, during a number of its inspections, GC finds that P has violated fall protection requirements. It points the violations out to P during each inspection but takes no further actions.

   Analysis: **Step 1**: GC is a controlling employer since it has general supervisory authority over the site, including a contractual right of control over P. **Step 2:** GC took adequate steps to meet its obligation to discover violations. However, it failed to take reasonable steps to require P to correct hazards since it lacked a graduated system of enforcement. A citation to GC for the fall protection violations is appropriate.

   (3) **Example 8**: Employer GC contracts with Sub E, an electrical subcontractor. GC has full contract authority over Sub E, as in Example 6. Sub E installs an electric panel box exposed to the weather and implements an assured equipment grounding conductor program, as required under the contract. It fails to connect a grounding wire inside the box to one of the outlets. This incomplete ground is not apparent from a visual inspection. Further, GC inspects the site with a frequency appropriate for the site in light of the factors discussed above in (G)(3). It saw the panel box but did not test the outlets to determine if they were all grounded because Sub E represents that it is doing all of the required tests on all receptacles. GC knows that Sub E has implemented an effective safety and health program. From previous experience it also knows Sub E is familiar with the applicable safety requirements and is technically competent. GC had asked Sub E if the electrical equipment is OK for use and was assured that it is.

   Analysis: Step 1: GC is a controlling employer since it has general supervisory authority over the site, including a contractual right of control over Sub E. **Step 2:** GC exercised reasonable care. It had determined that Sub E had technical expertise, safety knowledge and had implemented safe work practices. It conducted inspections with appropriate frequency. It also made some basic inquiries into the safety of the

electrical equipment. Under these circumstances GC was not obligated to test the outlets itself to determine if they were all grounded. It is not citable for the grounding violation.

b. Control Established by a Combination of Other Contract Rights: Where there is no explicit contract provision granting the right to control safety, or where the contract says the employer does not have such a right, an employer may still be a controlling employer. The ability of an employer to control safety in this circumstance can result from a combination of contractual rights that, together, give it broad responsibility at the site involving almost all aspects of the job. Its responsibility is broad enough so that its contractual authority necessarily involves safety. The authority to resolve disputes between subcontractors, set schedules and determine construction sequencing are particularly significant because they are likely to affect safety. (NOTE: citations should only be issued in this type of case after consulting with the Regional Solicitor's office).

(1) **Example 9**: Construction manager M is contractually obligated to: set schedules and construction sequencing, require subcontractors to meet contract specifications, negotiate with trades, resolve disputes between subcontractors, direct work and make purchasing decisions, which affect safety. However, the contract states that M does not have a right to require compliance with safety and health requirements. Further, Subcontractor S asks M to alter the schedule so that S would not have to start work until Subcontractor G has completed installing guardrails. M is contractually responsible for deciding whether to approve S's request.

Analysis: **Step 1:** Even though its contract states that M does not have authority over safety, the combination of rights actually given in the contract provides broad responsibility over the site and results in the ability of M to direct actions that necessarily affect safety. For example, M's contractual obligation to determine whether to approve S's request to alter the schedule has direct safety implications. M's decision relates directly to whether S's employees will be protected from a fall hazard. M is a controlling employer. **Step 2:** In this example, if M refused to alter the schedule, it would be citable for the fall hazard violation.

(2) **Example 10**: Employer ML's contractual authority is limited to reporting on subcontractors' contract compliance to owner/developer O and making contract payments. Although it reports on the extent to which the subcontractors are complying with safety and health infractions to O, ML does not exercise any control over safety at the site.

Analysis: **Step 1:** ML is not a controlling employer because these contractual rights are insufficient to confer control over the subcontractors and ML did not exercise control over safety. Reporting safety and health infractions to another entity does not, by itself (or in combination with these very limited contract rights), constitute an exercise of control over safety. **Step 2:** Since it is not a controlling employer it had no duty under the OSH Act to exercise reasonable care with respect to enforcing the subcontractors' compliance with safety; there is therefore no need to go to Step 2.

c. Architects and Engineers: Architects, engineers, and other entities are controlling employers only if the breadth of their involvement in a construction project is sufficient to bring them within the parameters discussed above.

(1) **Example 11**: Architect A contracts with owner O to prepare contract drawings and specifications, inspect the work, report to O on contract compliance, and to certify completion of work. A has no authority or means to enforce compliance, no authority to approve/reject work and does not exercise any other authority at the site, although it does call the general contractor's attention to observed hazards noted during its inspections.

Analysis: Step 1: A's responsibilities are very limited in light of the numerous other administrative responsibilities necessary to complete the project. It is little more than a supplier of architectural services and conduit of information to O. Its responsibilities are insufficient to confer control over the subcontractors and it did not exercise control over safety. The responsibilities it does have are insufficient to make it a controlling employer. Merely pointing out safety violations did not make it a controlling employer. NOTE: In a circumstance such as this it is likely that broad control over the project rests with another entity. **Step 2:** Since A is not a controlling employer it had no duty under the OSH Act to exercise reasonable care with respect to enforcing the subcontractors' compliance with safety; there is therefore no need to go to Step 2.

(2) **Example 12**: Engineering firm E has the same contract authority and functions as in Example 9.

Analysis: **Step 1:** Under the facts in Example 9, E would be considered a controlling employer. **Step 2:** The same type of analysis described in Example 9 for Step 2 would apply here to determine if E should be cited.

d. Control Without Explicit Contractual Authority . Even where an employer has no explicit contract rights with respect to safety, an employer can still be a controlling employer if, in actual practice, it exercises broad control over subcontractors at the site (see Example 9). NOTE: Citations should only be issued in this type of case after consulting with the Regional Solicitor's office.

(1) **Example 13**: Construction manager MM does not have explicit contractual authority to require subcontractors to comply with safety requirements, nor does it explicitly have broad contractual authority at the site. However, it exercises control over most aspects of the subcontractors' work anyway, including aspects that relate to safety.

Analysis: Step 1: MM would be considered a controlling employer since it exercises control over most aspects of the subcontractor's work, including safety aspects. **Step 2:** The same type of analysis on reasonable care described in the examples in (G)(5)(a) would apply to determine if a citation should be issued to this type of controlling employer.

F. Multiple Roles

1. A creating, correcting or controlling employer will often also be an exposing employer. Consider whether the employer is an exposing employer before evaluating its status with respect to these other roles.
2. Exposing, creating and controlling employers can also be correcting employers if they are authorized to correct the hazard.

Directives - Table of Contents

Job Hazard Analysis

Date	
Project Name/Market	
Project No.	
Site No.	
Contractor Name	
Contractor Field Supervisor	

Identification of Rooftop Hazards

Can any of the work be performed on the ground? ☐	**Work location requires controlled descent to access?**	**Are certified anchor points being used?** ☐ No ☐ Yes
Is there a parapet wall? ☐ Yes ☐ No *Height: (<39" is considered unpr*	☐ No ☐ Yes: *Controlled descent plan required.*	**Has the certification been verified?** ☐ No ☐ Yes
Work within 15' of roof edge or skylight? ☐ **Yes** ☐ **No:** ***Action**: Set up flagging minimum spacing 6', height >34", <39".*	**Does the work location require a ladder?** ☐ No☐ Yes *Ladder Height:* **RF has been identified?** ☐ Yes ☐ No	

Required PPE for Job Task

☐ Hard Hat	☐ Gloves (type)	☐ Other (specify):
☐ Safety Glasses	☐ RF Monitor	
☐ Ear Plugs	☐ RF Suit	

Fall Protection System	**Fall Protection Equipment**			
☐ Guardrails/Parapet wall >39".	☐ Full Body Harness	☐ Rope grab	☐ Fall Arrest Lanyard	
☐ Fall Restraint	☐ Descent device	☐ Anchor straps	☐ Rope	☐ SRD
☐ Fall Arrest	☐ Work Positioning System		☐ Other (specify):	

Roof Condition, Documentation and Protection

Mandatory Roof Protection Measures - Keeping on designated walkways whenever possible. - ABSOLUTELY no roof penetrations. - Tether all "sharp" tools to avoid any accidental punctures.	**Roof Condition:** ☐ Unsafe ☐ Poor ☐ Fair ☐ Good *Action: make detailed notes on any roof condition not rated "Good." Include photographs for any deficiencies found.*

Hazard Analysis (Hazards and PPE identified above should be addressed below)

Sequence of Job/Task	Potential Hazards	Hazard Mitigation Measures

Employee Acknowledgement of JHA (All personnel entering jobsite must read and sign, add additional to reverse side of this form)

Printed Name:	Signature:

Supervisor Acknowledgement of JSA and Site Personnel

Supervisor Name:	Supervisor Signature: