



*Mid Atlantic Construction
Safety Council*

January 12, 2024

ROOF HAZARDS



INDUSTRIAL HYGIENE HAZARDS

Roofing Projects

*Alan Lloyd, CIH, CSP, ENV, AP,
WELL AP
Vice - President, EHS Practice Lead*



Industrial Hygiene?

Is a science and art devoted to the anticipation, recognition, evaluation, and control of those environmental factors or stresses arising in or from the workplace, which may cause sickness, impaired health and well-being, or significant discomfort among workers or among the citizens of the community.

Identifying Occupational Health Hazards

- ∪ Chemical
solvents, adhesives, paints, toxic dusts, etc.
- ∪ Physical
noise, radiation, heat/cold, etc.
- ∪ Biological
infectious diseases, animals, plants, etc
- ∪ Ergonomic
heavy lifting, repetitive motions, vibration



Industrial Hygiene Hazards on Roofing Projects



Asbestos



Lead



Fumes



Biological Hazards



Radiation

Asbestos-Containing Materials



Asbestos-Containing Materials

1. Still Legal! (kind of)

- *1980 or older must assume / 1980 or newer should assume*
- *No date referenced by EPA*

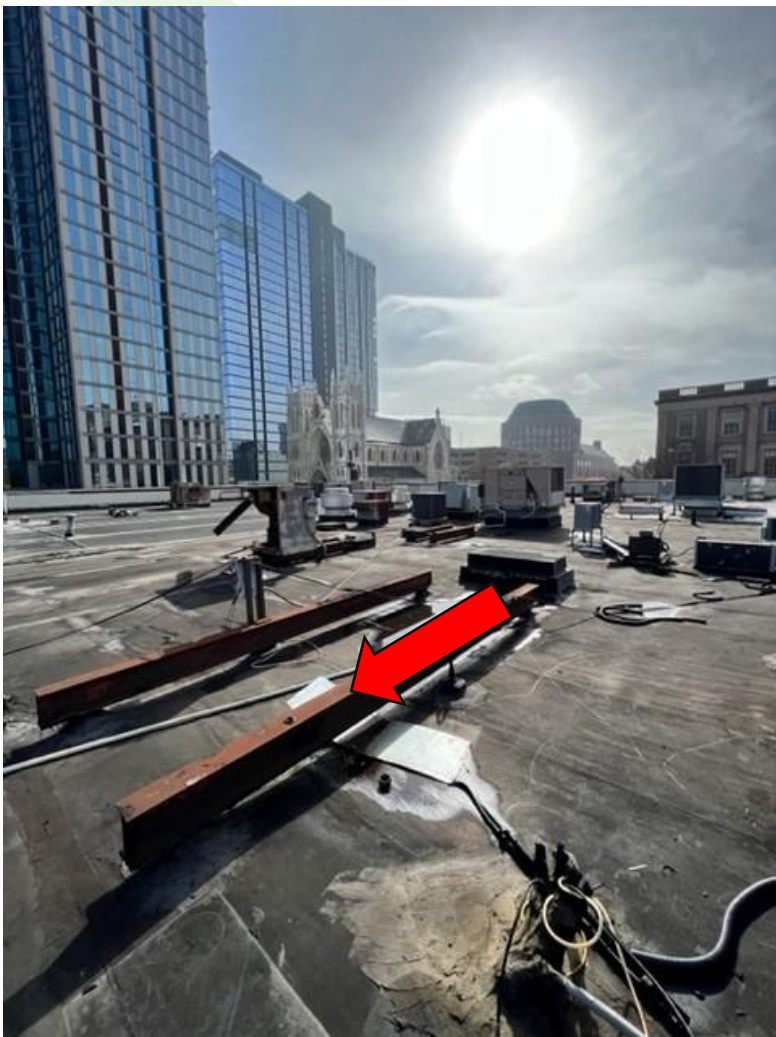
2. OSHA Regulates Removal [1926.1101\(g\)\(8\)\(ii\)](#)

- *For removing roofing material which contains ACM the employer shall ensure that the following work practices are followed...*
- *EPA allows demo with ACM roofing, but with specific requirements*

3. Test or Assume

4. Leave alone

Lead-Based Paint



Lead-Based Paint

1. Banned in 1978
2. OSHA = Exposure (29 CFR 1926.62)
3. EPA = Disposal (TCLP)
4. Test = bulk, XRF, instant
5. Don't Torch or Grind



Chemical Fumes



Chemical Fumes

1. Know Building Operation Activities
2. Asphalt Fumes – PPE
3. Naptha (Coal Tar) – PPE (Skin!)
4. Solvents – PPE (read SDS)

Biological Hazards



Biological Hazards

Legionella

Legionella (Legionnaires' Disease and Pontiac Fever)

CDC > Legionella Home > Prevention and Control > Legionella Control Toolkit

Legionella Home

About the Disease +

Fast Facts

For Clinicians +

For Health Departments +

For Laboratories

Prevention and Control -

Overview of Water Management Programs

Water Management Program Toolkit +

Controlling *Legionella* in Cooling Towers

[Print](#)

Key Points

- Scale, corrosion, sediment controls, and system cleaning are critical for cooling tower operations and Legionnaires' disease prevention.
- Disinfectant residual should be monitored and adjusted by an automated system.
- *Legionella* risks are similar for open and closed-circuit cooling tower systems.

Purpose

Use this document to:

On This Page

[Key Points](#)

[Purpose](#)

[Design](#)

[Operation, Maintenance, and Control Limits](#)

[Remediation](#)

[Related Pages](#)

Biological Hazards

1. Histoplasmosis

- *Treat with bleach solution*
- *Respiratory Protection*

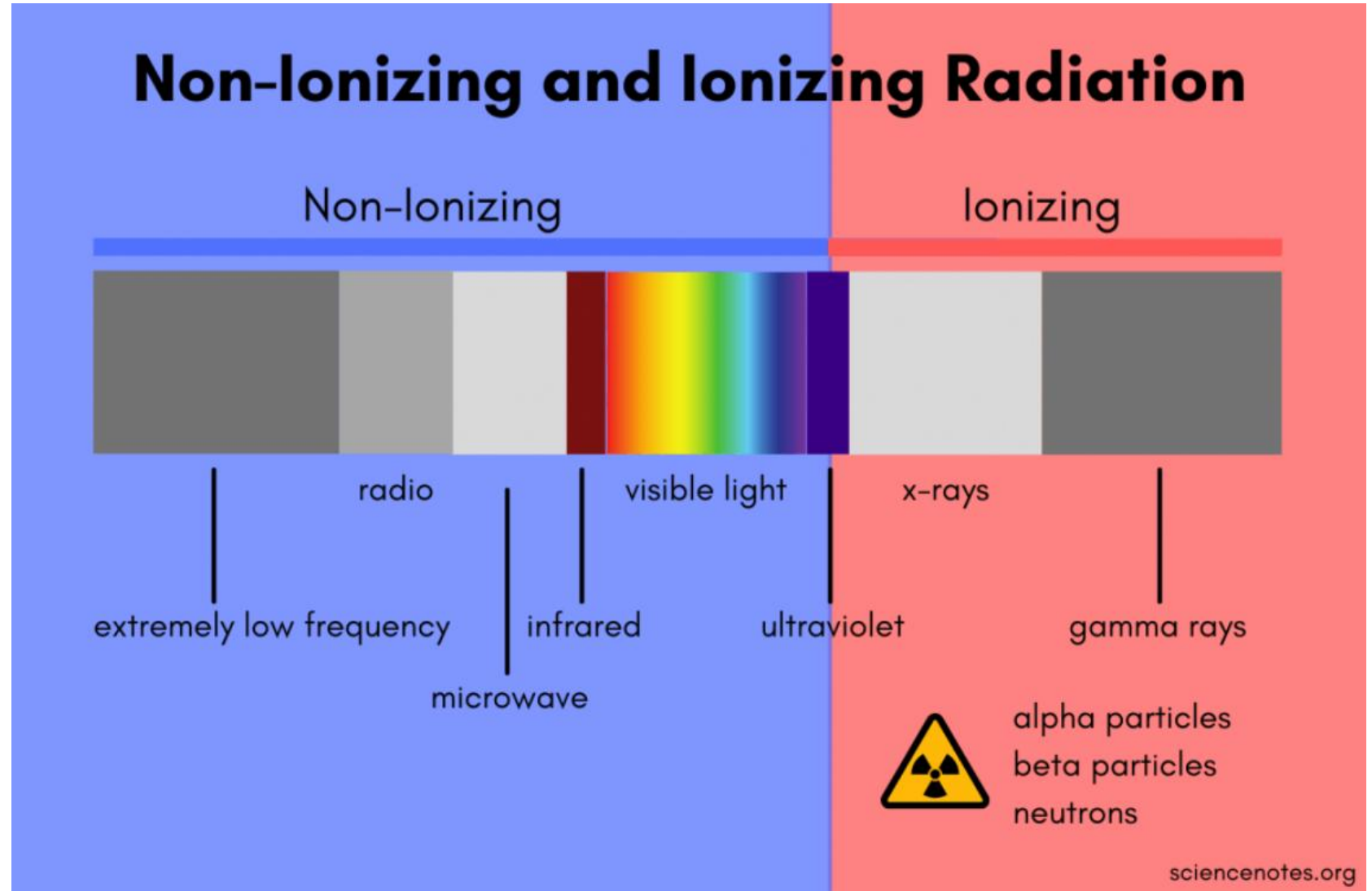
2. Leave Wildlife alone

3. Poison Ivy Block



Non-Ionizing Radiation

Non-ionizing radiation is a form of radiation with less energy than ionizing radiation.



Non-Ionizing Radiation



UV Light



Infrared Rad



Radio Waves



Lasers

Health Effects:

- skin cancer
- eye damage
- Burns
- premature skin aging

Non-Ionizing Radiation



Radio Waves

When RF energy is very strong it can be dangerous.

Health affects include headaches, fatigue stress, trouble sleeping, and burning sensations on the skin. Depending on the length and levels of exposure, RF radiation can lead to hospitalization and debilitation.

These extremely high RF energy levels are only found near large and powerful equipment, such as commercial long-distance transmitters mounted on communication towers or roofs.



Non-Ionizing Radiation

- OSHA 1910.97 - Nonionizing radiation. 10 mW/cm.² for periods of 0.1-hour or more.
- FCC - 580 microwatts/cm.² for general public
- Areas of high RF should be isolated per OSHA and FCC requirements

If need to enter an isolated area:

- *Proper Lockout-Tagout Procedures*
- *Disable Remote Operation*
- *Wearing Protective Suits*
- *Monitors Worn Outside of Suit*



Initial Risk Assessment



- **Unacceptable or Intolerable** — engineering and/or administrative controls, personal protective equipment
- **Acceptable** — no action is required but routine monitoring may be needed
- **Uncertain** — additional information is required.



HEAT STRESS DURING ROOFING OPERATIONS

*Frank Baxter, CSP, M.S.
Director of Loss Prevention*

Heat-Related Deaths

HEAT-RELATED DEATHS IN CONSTRUCTION

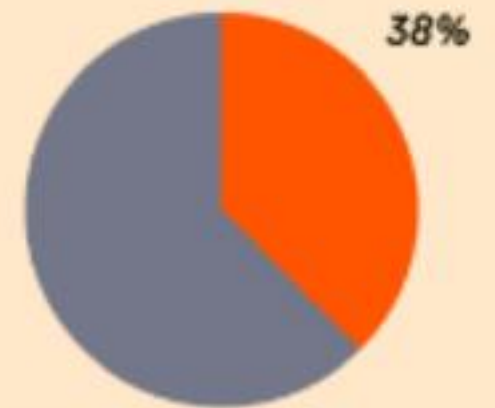
Construction workers accounted for **only 7%** of the U.S. workforce, but experienced **38% of all heat-related deaths at work in 2020.**^{1,2,3}

Employment



Construction

Heat-Related Deaths



All other industries

When is hot too hot?

- ▶ NIOSH says the body responds to heat stress by working harder to lose heat through sweating and increased heart rate to maintain a normal core body temperature (about 98.6 F). This physiological response is referred to as heat strain.
- ▶ Please note OSHA NEP kicks in at 80 F or higher

What is in your Control?

▶ The body's ability to maintain a normal core body temperature is influenced by several factors, including:

- Air temperature **OUT of Your Control**
- Humidity **OUT of Your Control**
- Radiant heat (such as working in direct sunlight) **Somewhat In Your Control**
- Skin temperature **OUT of Your Control**
- The speed and temperature of air moving over the body **Somewhat INYour Control**
- Hydration **Somewhat IN Your Control**
- Clothing **Somewhat IN Your Control**
- Fitness level **In the Employee's Control**
- Age **In the Employee's Control**
- Preexisting health conditions **In the Employee's Control**

Alcohol is

What medications interact with heat regulation:

- Antibiotics and acne medication
- Antidepressants and psychiatric medication
- Blood pressure and heart medication
- Cold and allergy medications
- Overactive bladder medication

AGC Heat NEP Q&A

AGC Heat NEP Questions / OSHA Responses (6-12-2023)

1. **Question:** How does OSHA define a new or returning worker with respect to acclimatization?

Response: OSHA includes guidance on protecting new and returning workers on its Heat Safety and Health Topics page at: <https://www.osha.gov/heat-exposure/protecting-new-workers>. For purposes of that guidance, the term "workers who are new to working in warm environments" includes the following groups:

• New hires
• Workers who have not worked in warm environments for at least 14 days
• Workers who have not worked in warm environments for at least 14 days

How does OSHA define a new or returning worker with respect to acclimatization?

- ▶ New, temporary, or existing employees who start new work activities:
 - in warm or hot environments
 - while wearing additional clothing (e.g., chemical protective clothing)
 - with increased physical activity
- ▶ Workers returning to work environments with potential exposure to heat hazards after an absence of one week or more. This includes, for example, an existing worker returning from any kind of extended leave
- ▶ Workers who continue working through seasonal changes when temperatures first begin to increase in the spring or early summer.
- ▶ Workers who work on days when the weather is significantly warmer than on previous days (i.e., heat wave).

The NEP states that during heat-related inspections, compliance safety and health officers (CSHOs) should determine if the employer has a heat illness prevention program which includes a “buddy” system on hot days. Will the absence of such a system incorporated into a heat illness prevention program increase the potential for an employer to be cited under 5(a)(1)

▶ “Buddy”

- The buddy must be trained in signs and symptoms and know how to intervene

▶ Periodic Check-Ins to monitor workers for signs and symptoms

- In-person or cell phone/radio
- Train employee to self report signs and symptoms

CAUTION

**BUDDY SYSTEM IS
REQUIRED TO WORK
ON THE ROOF**

The NEP and [heat] illness campaign material discuss physiological and medical monitoring (e.g., monitoring blood pressure, heart rates, change in body temperature and weight). Does OSHA expect employers to incorporate this type of monitoring into their heat illness prevention programs?

- ▶ OSHA recognizes that many employers lack the expertise in this area to accurately take such physiological measurements. However, employers should consider all potential methods to control heat stress, including monitoring metabolic load. For example, new smart watches can help people monitor their own heart rates, and technologies exist for monitoring hydration levels. Some employers employ a medical specialist at their facility to provide monitoring and to determine if medical attention is needed beyond first aid, and/or if workloads need to be adjusted.



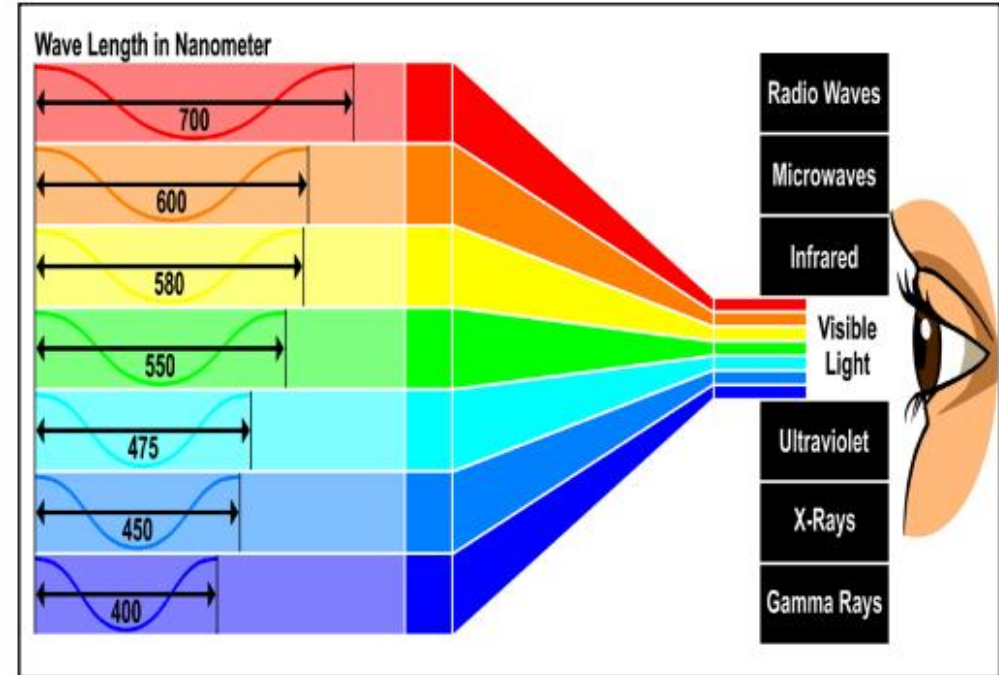
How is Heat Measured?

- Ambient air temperature is the temperature of the surrounding environment
- Heat index is the measurement of how hot it feels with relative humidity is factored in. *The Feels Like Temperature*
- Heat index does not consider other factors beyond ambient air temp and humidity such as
 - Solar load
 - Stagnate air
 - Clothing
- The wet bulb globe is a better choice to measure heat stress



Protecting against the Sun's Rays

- ▶ Here are some important facts about electromagnetic radiation and eye health:
 - UV levels are three times greater in summer than winter.
 - Sunlight reflected off of water, snow, and pavement intensifies UV light and makes it more dangerous.
 - 20% of cataract cases are due to UV rays.
 - 3.2 million people go blind every year due to prolonged UV exposure.



White roofing products stay coolest in the sun, reflecting about 60 – 90% of sunlight.

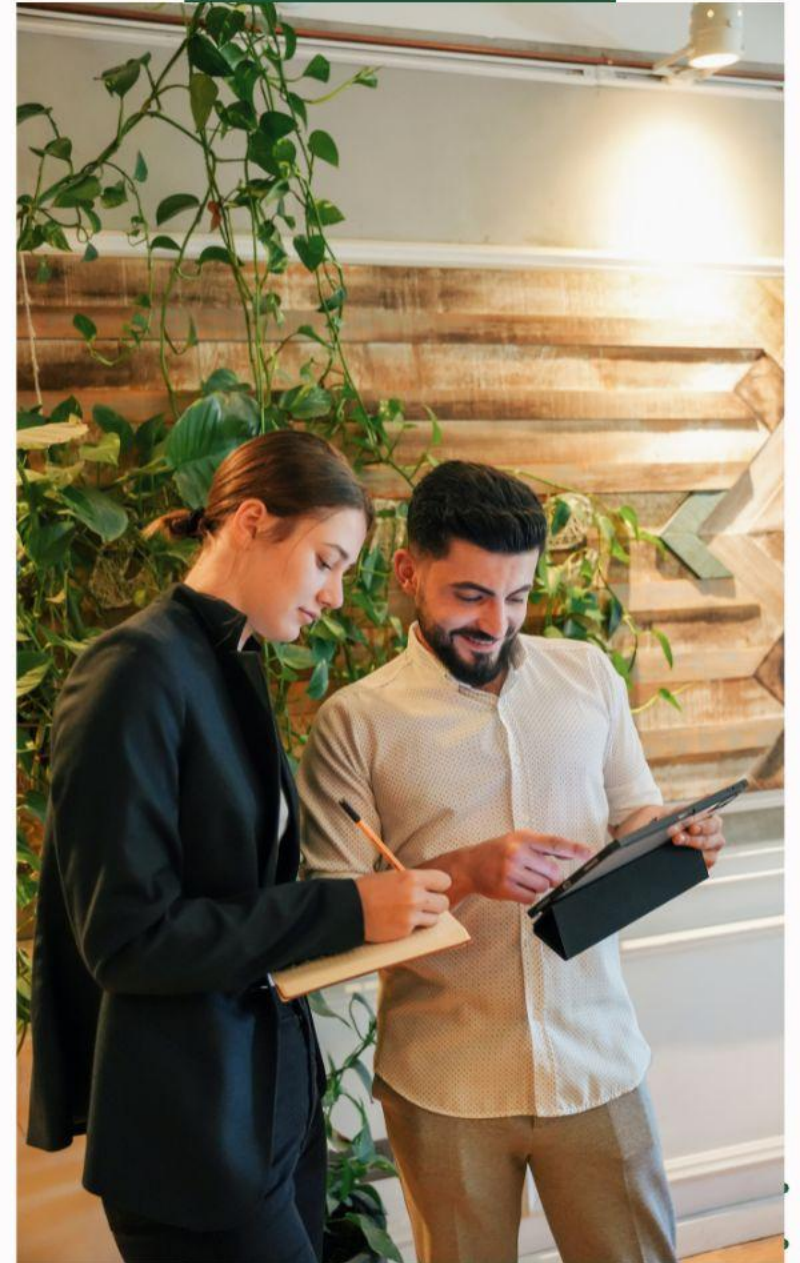




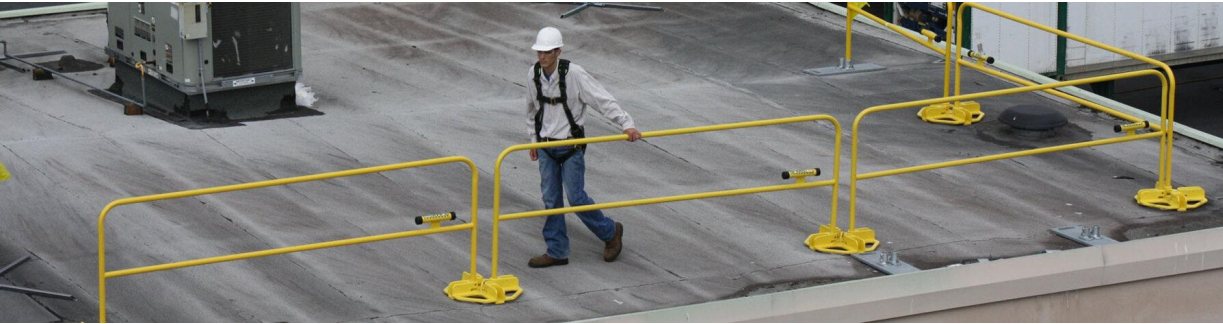
Mid Atlantic Construction
Safety Council

PHYSICAL HAZARDS REVIEW DANGER

Mike Gale, QSSP, Territory Manager
Med-Tex Services

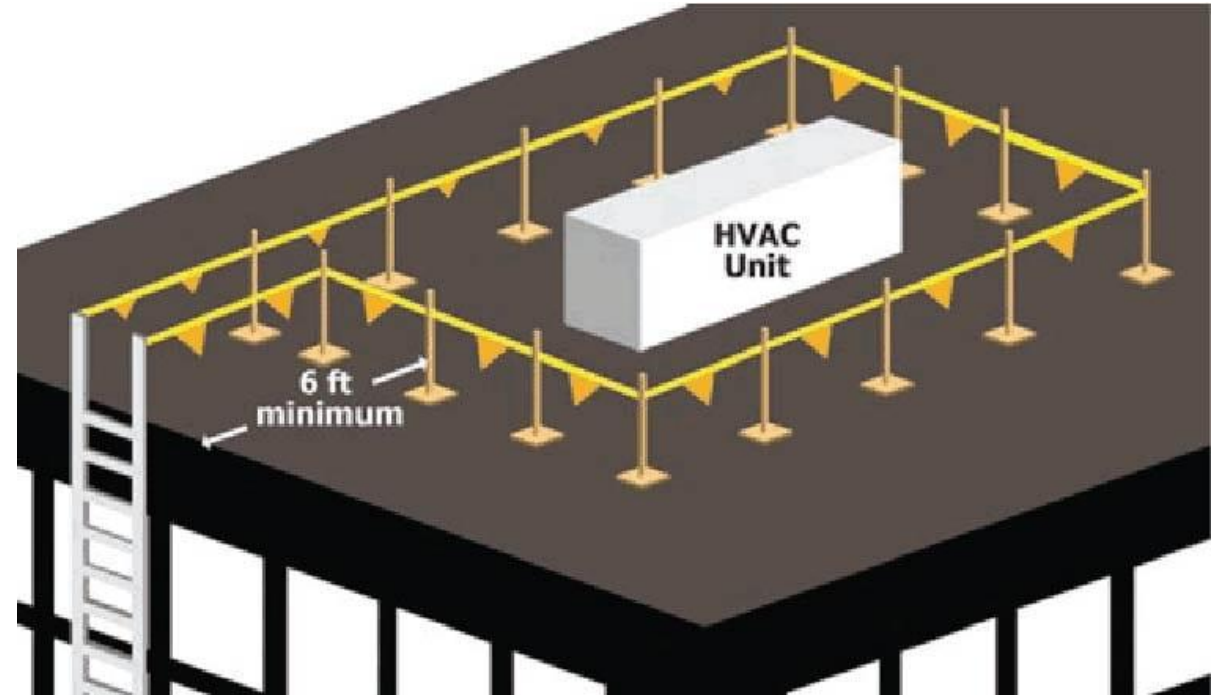


Types of Rooftop Fall Protection



Warning Line System

- Only to be used on a low-slope roof – no greater than a 4/12 pitch
- Must have a defined access path and be fully enclosed.
- Minimum height of the line is 34" (including sag) / Maximum height to be no greater than 39"
- Has to be no less than 6' from the edge of the roof
- Requires a safety monitor on the same surface at all times

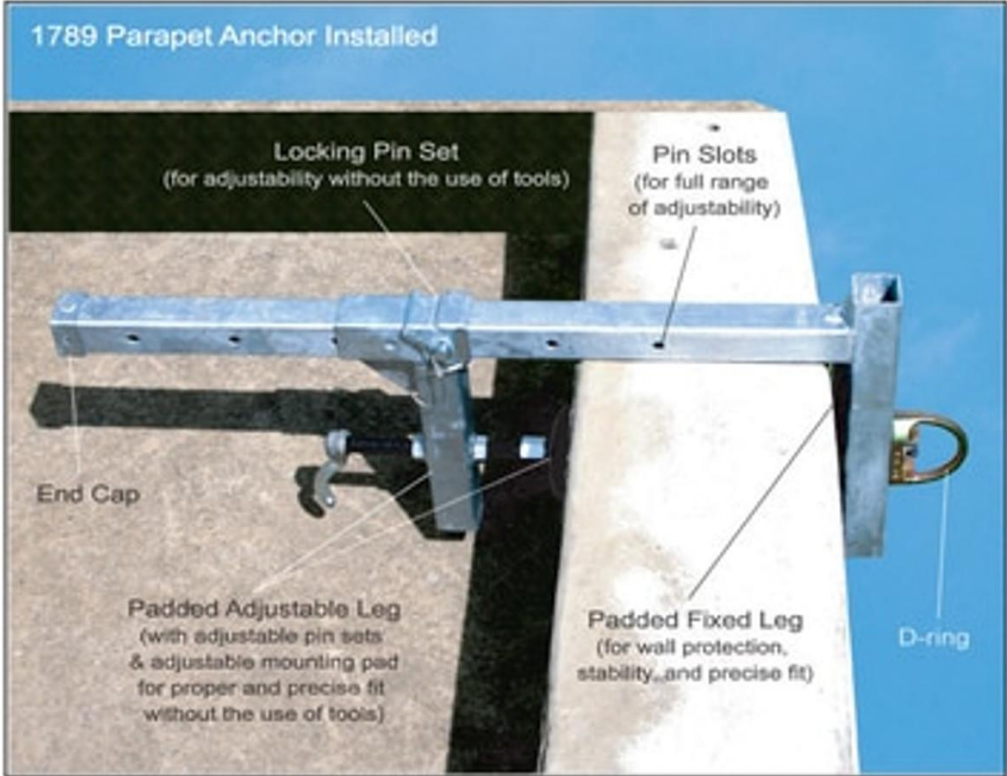


Parapets & Anchors

Have to meet the same requirements as guardrails - 42" Tall +/- 3"



Parapets & Anchors



Skylights

- Each employee on walking/working surfaces shall be protected from falling through holes (including skylights) more than 6 feet (1.8 m) above lower levels, by personal fall arrest systems, covers, or guardrail systems erected around such holes



Skylights



Engineered Anchors/Lifelines

- Active fall protection systems require recertification at intervals not to exceed 5 years, and suspended maintenance and window washing systems (rope descent systems) require recertification at intervals not to exceed 10 years.



Other Fall Protection Options



Other Fall Protection Options



Other Fall Protection Options



Resources

- ▶ [When is hot too hot? | Professional Roofing magazine](#)
- ▶ [CPWR Heat Hazards](#)
- ▶ [Solution | Real-time Physiological Monitoring For Heat Strain in Workers | Construction Solutions \(cpwrconstructionsolutions.org\)](#)
- ▶ [Criteria for a Recommended Standard: Occupational Exposure to Heat and Hot Environments \(cdc.gov\)](#)
- ▶ [CDC – Controlling Legionella in Cooling Towers](#)
- ▶ [OSHA 3755-Protecting Roof Workers](#)
- ▶ [CPWR – Media Fact Sheet – Falls from Roofs – Risk and Prevention](#)
- ▶ [OSHA – Fall Protection Checklist](#)
- ▶ [International Labour Organization – Occupational Hazard Datasheets – Roofer](#)
- ▶ [OSHA Directive # CPL 03-00-024 NEP – Outdoor and Indoor Heat-Related Hazards](#)



Mid Atlantic Construction Safety Council

THANK YOU
QUESTIONS