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Advanced Field Safety Strategies:
Proactive Risk Management for Cleaning and HVAC Operations

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Presenter

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Disclaimer

This presentation is not intended to be a comprehensive program covering all aspects of this topic. All technicians are encouraged to read and follow all applicable standards, codes and regulations related to this topic.

- ✓ It is the responsibility of each individual contractor to follow local building codes and licensing requirements and to work safely in accordance with OSHA guidelines.
- ✓ It is the contractor's responsibility to take proper precautions on each project to prevent cross contamination. Always take the health and safety of the building occupants into consideration before you conduct any cleaning procedures.
- ✓ All of the following tips are only general tips. They do not cover every situation and it is your responsibility to adapt these tips to the individual system you are working on.
- ✓ The Instructor is not responsible in any way for the work you perform after viewing this slide show. You are responsible for your own work.
- ✓ The views and opinions following are the instructors opinions and not necessarily the official position of the National Air Duct Cleaners Association.

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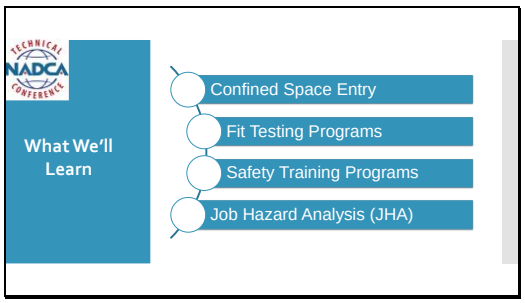

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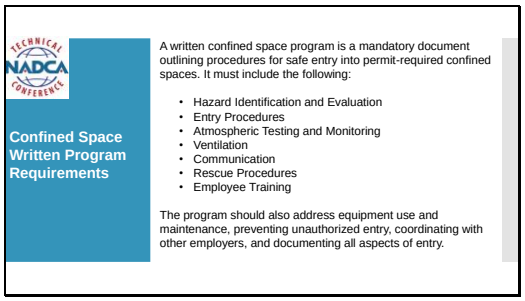

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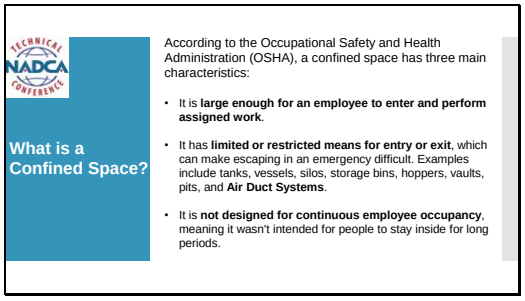

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What are Permit Required Confined Spaces (PRCS)?

Some confined spaces pose additional hazards and are classified as **permit-required confined spaces** (or permit spaces). These spaces have one or more of the following characteristics:

- Contain or have the potential to contain a **hazardous atmosphere**.
- Contain material that could **engulf an entrant**.
- Have an internal configuration that could **trap or asphyxiate an entrant**.
- Contain any other **recognized serious safety or health hazard**.

Employers are required to assess confined spaces for these hazards and use a permit system for entry into permit-required confined spaces. (OSHA 1910.146)

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CSE Safe Entry Procedures

- Develop a **Permit-to-Work** system to control entry into permit-required confined spaces.
- Ensure **isolation procedures** are in place to prevent the release of hazardous energy or materials into the space.
- Conduct **atmospheric testing** before and during entry to verify oxygen levels, detect flammable gases/vapors, and identify toxic substances.
- Implement **appropriate ventilation techniques**, such as purging, flushing, or forced air ventilation.
- Use **personal protective equipment (PPE)**, including respiratory protection, head protection, eye and face protection, hearing protection, hand and arm protection, body protection, footwear, and fall protection, as needed.

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CSE Emergency Planning and Rescue

- Develop a **comprehensive confined space rescue plan** detailing procedures, equipment, and personnel required for safe extrication in emergencies.
- Establish an alarm and response system for emergency situations.
- Provide training in CPR and first aid to ensure immediate medical attention for injured workers.
- Ensure the availability of trained and equipped rescue personnel, either an on-site team or external rescue services.

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CSE Equipment and Systems

- Utilize appropriate equipment, such as atmospheric monitors, ventilation equipment, lighting, barriers and shields, ladders, and retrieval systems.
- Ensure all equipment is properly maintained and inspected regularly.
- Use **intrinsically safe equipment** in potentially explosive atmospheres to prevent ignition.

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What are the Atmospheric Hazards?

1. Insufficient Oxygen:
- Confined spaces can have low oxygen levels due to displacement by other gases, absorption by damp surfaces, or chemical reactions.

2. Toxic Atmospheres:
- HVAC systems can release gases like carbon monoxide, carbon dioxide, and other toxic substances, creating a poisonous environment.

3. Flammable Atmospheres:
- The presence of flammable liquids, gases, or dust can lead to explosions or fires in confined spaces.

4. Oxygen Enrichment:
- In some cases, excessive oxygen can create a fire hazard.

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Common CSE Physical Hazards in the HVAC Industry

1. Falls:
- Limited entry and exit points in confined spaces can increase the risk of falls during entry, exit, or while working.

2. Engulfment:
- Workers can be trapped or engulfed by flowing liquids or solids entering the confined space.

3. Entrapment:
- Sloping walls or other obstructions can trap workers, making escape difficult.

4. Extreme Temperatures:
- Confined spaces can trap heat or cold, leading to heat stress or hypothermia.

5. Noise:
- High noise levels in confined spaces can cause hearing damage.

6. Electrical Hazards:
- HVAC systems often involve electricity, creating the risk of electrical shock or arc flash accidents.

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Common CSE Chemical and Respiratory Hazards in the HVAC Industry

1. **Refrigerant Leaks:**
   - Refrigerants used in HVAC systems can be toxic or hazardous if inhaled or if they come into contact with skin.
2. **Chemical Exposure:**
   - Cleaning solutions, solvents, and other chemicals used in HVAC work can cause burns, irritation, or poisoning.
3. **Asbestos:**
   - Older buildings may contain asbestos in insulation or ductwork, which can be hazardous if disturbed.

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Other CSE Common Hazards in the HVAC Industry

1. **Insufficient Training:**
   - Lack of proper training on confined space safety procedures can lead to accidents.
2. **Rushed Work:**
   - Working too quickly to meet deadlines can increase the risk of accidents.
3. **Inadequate PPE:**
   - Not using appropriate personal protective equipment can expose workers to hazards.
4. **Dust Accumulation:**
   - Dust accumulation in confined spaces can create fire or explosion hazards, especially in poorly ventilated areas.

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CSE Training

What Does OSHA Say?

OSHA 1910.146(g) Training

The employer shall provide training so that all employees whose work is regulated by this section acquire the understanding, knowledge, and skills necessary for the safe performance of the duties assigned under this section.

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When is Training Needed for CSE?

Training shall be provided to each affected employee:

- ✓Before the employee is first assigned duties under this section;
- ✓Before there is a change in assigned duties;
- ✓Whenever there is a change in permit space operations that presents a hazard about which an employee has not previously been trained;
- ✓Whenever the employer has reason to believe that there are deviations from the permit space entry procedures.

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Who Needs CSE Training?

Authorized Entrant
Enters the confined space

Authorized Attendant
Stands watch outside the entry point of the space

Entry Supervisor
Oversees entry, ensures conformity to permit & acceptable conditions for entry

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CSE Training Records

Training: Must Be Certified In Writing

- ✓ for each affected employee
- ✓ before first assignment & with changes
- ✓deviations from space entry procedures
- ✓shall establish employee proficiency

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Fit Testing Programs

What is a Fit Testing Program?

- A respirator fit testing program is a process to ensure that respirators, which are used to protect workers from breathing in harmful airborne substances, fit the wearer properly and provide the intended level of protection.
- This involves testing the seal of the respirator on a worker's face to verify it's tight and effective. Fit testing is crucial for tight-fitting respirators and is typically required annually.

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What does OSHA Say?

OSHA mandates that employees who use tight-fitting respirators must undergo fit testing to verify the respirator creates a proper seal against the face. (1910.134)

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Fit Testing Program Key Requirements

1. Initial Fit Testing:
- Before a worker uses a tight-fitting respirator for the first time, they must pass a fit test.

2. Annual Fit Testing:
- Fit testing is required at least annually, even if no changes have occurred.

3. Changes in Respirator or User:
- If the respirator model, style, or size changes
- If the user's physical condition (like weight fluctuations or dental work) that could affect the fit

4. Fit Test Methods:
- OSHA accepts Qualitative Fit Testing (QLFT) and Quantitative Fit Testing (QNFT) methods, as outlined in Appendix A of the Respiratory Protection standard.

5. User Seal Check:
- In addition to fit testing, OSHA requires users to perform a user seal check each time they don the respirator to ensure a proper fit.

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What is a Fit Test?

- A fit test is a procedure used to determine how well a respirator seals against the wearer's face.
- It ensures that the respirator effectively protects the wearer from hazardous airborne particles, dust, fumes, or gases.
- Fit testing is not the same as a user seal check, which is a quick check performed each time a respirator is donned.

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Why is Fit Testing Necessary?

1. Protection:
- Fit testing ensures the respirator provides the intended level of protection by verifying a tight seal.

2. OSHA Compliance:
- The Occupational Safety and Health Administration (OSHA) mandates fit testing for tight-fitting respirators.

3. Preventing Exposure:
- A proper fit prevents contaminated air from leaking into the respirator, protecting the wearer from hazardous substances.

4. Annual Requirement:
- Fit testing should be performed at least annually or whenever there are changes in the respirator type, user weight, or facial features.

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Fit Test Types

1. Qualitative Fit Test:
- A pass/fail test that relies on the wearer's senses (taste, smell, or irritation) to detect leakage.

2. Quantitative Fit Test:
- Uses specialized equipment to measure the amount of leakage into the respirator, providing a numerical fit facto

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Fit Testing Key Considerations

1. Facial Hair:
- Facial hair can interfere with the respirator's seal and should be addressed, potentially requiring a different type of respirator.

2. Other PPE:
- Workers should wear any other personal protective equipment (like glasses or goggles) during the fit test to ensure it doesn't interfere with the respirator's seal.

3. Training:
- Fit testing is part of a comprehensive respiratory protection program that also includes training on proper respirator selection, use, maintenance, and care.

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Safety Training Programs in the HVAC Industry

- HVAC safety training programs are crucial for equipping technicians with the knowledge and skills to work safely with electrical components, hazardous materials, and heavy equipment.
- These programs cover a range of topics, from basic safety protocols to specific procedures related to refrigerants, electrical systems, and confined spaces. Essential certifications like EPA 608, NATE, and OSHA 10/30 are often included in HVAC training to ensure technicians meet industry standards.

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Hazard Assessment and Identification Training

Hazard assessment and identification training teaches individuals and organizations to identify, assess, and control hazards in the workplace to create safer and healthier work environments. The key aspects to this training program are:

- Identifying Hazards
- Understanding Risk Assessments
- Implementing Control Measures
- Following Safety Procedures
- Promoting a Positive Safety Culture

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Refrigerants

What does OSHA say about training when working with Refrigerants?

There are multiple OSHA regulations that deal specifically with refrigerants and training employees that work with refrigerants. The following regulations lay out the requirements of each program and training:

- **EPA Section 608 and NATE**
- **Process Safety Management (PSM) (29 CFR 1910.119):**
- **Hazard Communication (29 CFR 1910.1200):**
- **Respiratory Protection (29 CFR 1910.134):**
- **Emergency Response (29 CFR 1910.38)**

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What is Process Safety Management (PSM)?

Process Safety Management (29 CFR 1910.119)

This standard applies to systems containing certain amounts of highly hazardous chemicals, including some refrigerants like ammonia. The PSM standard requires employers to train employees on:

- The process and equipment involved.
- The hazards associated with the refrigerant.
- Safe work practices, including emergency procedures.
- The potential fire, explosion, or toxic release hazards related to their job.

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Does PSM Training Apply to Me?

- The simple answer is **Yes!!** HVAC employees, especially those working in industrial settings that handle **highly hazardous chemicals (HHCs)**, should receive training on Process Safety Management (PSM).
- You are not required to have a PSM plan unless you manufacture, store, use, handle, or move HHC's at or above specific threshold limits as set by OSHA and the EPA.

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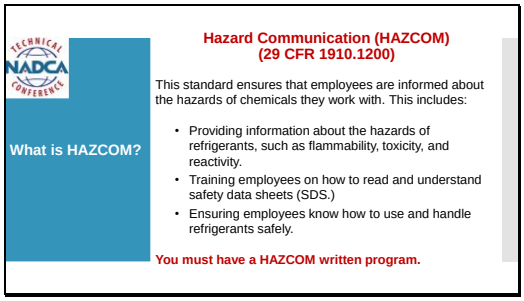

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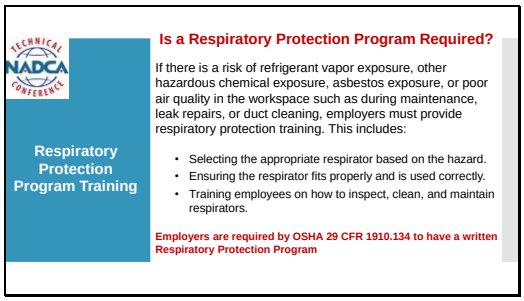

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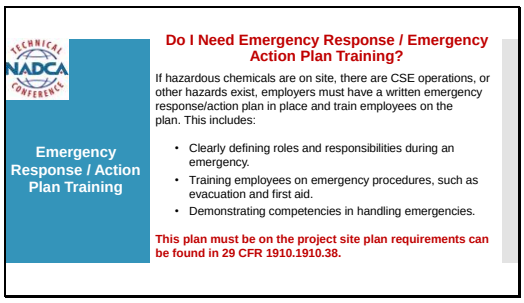

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What is a JHA?

Job Hazard Analysis (JHA)

A Job Hazard Analysis (JHA), also sometimes called a Job Safety Analysis (JSA), is a technique used to identify potential hazards associated with specific tasks or jobs within a workplace. It involves:

- Breaking down a job into its individual steps
- Identifying and analyzing each step for potential hazards
- Developing control measures to eliminate or minimize those hazards.

This proactive approach helps prevent accidents and injuries by addressing potential risks before they can cause harm.

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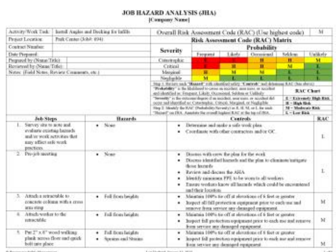
JHA Example



JOB HAZARD ANALYSIS (JHA)
[Company Name]

Activity/Work Task:	Install Angles and Decking for Infills
Project Location:	Park Center (Job#: 694)
Contract Number:	
Date Prepared:	
Prepared by (Name/Title):	
Reviewed by (Name/Title):	
Notes: (Field Notes, Review Comments, etc.)	

Overall Risk Assessment Code (RAC) (Use highest code): M

Risk Assessment Code (RAC) Matrix

Severity	Probability: Frequent	Likely	Occasional	Seldom	Unlikely
Catastrophic	E	E	H	H	M
Critical	E	H	H	M	L
Marginal	H	M	M	L	L
Negligible	M	L	L	L	L

RAC Chart
E = Extremely High Risk
H = High Risk
M = Moderate Risk
L = Low Risk

Job Steps	Hazards	Controls	RAC
1. Survey site to note and evaluate existing hazards and/or work activities that may affect safe work practices.	• None	• Determine and make a safe work plan • Coordinate with other contractors and/or GC	L
2. Pre-job meeting	• None	• Discuss with crew the plan for the work • Discuss identified hazards and the plan to eliminate/mitigate those hazards • Review and discuss the AHA • Identify minimum PPE to be worn to all workers • Ensure workers know all hazards which could be encountered and their location	L
3. Attach a retractable to concrete column with a cross arm strap	• Fall from heights	• Maintain 100% tie off at elevations of 6 feet or greater • Inspect all fall protection equipment prior to each use and remove from service any damaged equipment	M
4. Attach worker to the retractable	• Fall from heights	• Maintain 100% tie off at elevations of 6 feet or greater • Inspect fall protection equipment prior to each use and remove from service any damaged equipment	M
5. Put 2" x 8" wood walking plank across floor and quick bolt into place	• Fall from heights • Sprains and Strains	• Maintain 100% tie off at elevations of 6 feet or greater • Inspect fall protection equipment prior to each use and remove from service any damaged equipment	M

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Analysis and Step Breakdown

What is the JHA Breakdown?

- Selecting Jobs for Analysis:
  - Prioritize jobs that have a high risk of injury or illness, or those that have a history of accidents.
  - Consider jobs with potential for severe or disabling injuries, even if there haven't been previous incidents.
  - Jobs involving new processes or procedures, or those that are complex and require written instructions should also be analyzed.
- Breaking Down the Job into Steps:
  - Divide the job into a sequence of logical steps, from start to finish.
  - Each step should be specific and easy to understand, but not overly detailed.

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JHA: Identifying Hazards

Identifying Hazards

1. For each step, identify potential hazards, which could be unsafe conditions or practices.

2. Common hazards include:

- Slips, trips, and falls
- Moving machinery and objects
- Noise, heat, and temperature extremes
- Exposure to chemicals, radiation, or toxic substances
- Electrical hazards
- Ergonomic hazards (e.g., repetitive tasks, heavy lifting)

Consider what could go wrong, what the consequences could be, and how likely it is to occur.

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JHA: Developing Control Measures

When and How Do You Develop Control Measures?

- Once hazards are identified, develop control measures to eliminate or minimize them.
- Controls should be prioritized using the hierarchy of controls, starting with elimination and moving to substitution, engineering controls, administrative controls, and finally, personal protective equipment (PPE).
- Examples of control measures:
  - Eliminating the hazard altogether
  - Using machine guarding to prevent contact with moving parts
  - Implementing safe work procedures
  - Providing appropriate PPE

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JHA Review and Update

When Should You Review and Update?

A JHA should be reviewed and updated which ensures the JHA accurately reflects current conditions and continues to be an effective tool for workplace safety.

- **Changes in the job:** This includes modifications to tasks, equipment, or the work environment.
- **New equipment or materials:** Introduction of new tools or substances can introduce new hazards.
- **Changes in procedures:** Revisions to how a job is performed require a review of the JHA.
- **Accidents or near misses:** Analyzing incidents helps identify gaps in the JHA and allows for necessary updates.
- **Annual review:** Many organizations schedule a yearly review of all JHAs to ensure they remain current.
- **When new information is needed:** If new hazards are identified or if existing controls prove ineffective, the JHA should be updated.

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JHA: How Do You Review and Update?

1. Involve employees:
- Those who perform the job regularly should be involved in the review process. Their practical knowledge is invaluable in identifying hazards and developing effective controls.

2. Document changes:
- Record all updates, including the date of the review and any modifications made to the JHA.

3. Use a systematic approach:
- Follow a structured process for identifying hazards, assessing risks, and implementing controls.

4. Consider the hierarchy of controls:
- Prioritize elimination, substitution, engineering controls, administrative controls, and PPE in that order when developing controls.

5. Communicate changes:
- Ensure that all affected employees are aware of the updated JHA and any new procedures.

6. Digital tools:
- Utilize digital platforms and software for creating, storing, and managing JHAs, making them easily accessible and updatable.

By regularly reviewing and updating JHAs, organizations can maintain a safe and healthy work environment, reduce the risk of accidents and injuries, and promote a culture of safety.

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