Respiratory Safety and PPE
Module 7

Special Warehouse Worker Hazards in Structural Steel Fabricating and Supply Companies

Drawing from OSHA 3384-09 2011
OSHA Grant Information

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Program Development

This program was developed by faculty and students in the School of Planning Design and Construction, Michigan State University in conjunction with the American Inistitute of Steel Construction, Safety Committee and the the University of Pureto Rico

March 2015
Respiratory Safety and PPE
Module 7

Learning Outcomes: Participants shall be able to:

- Demonstrate understanding of respiratory risks
- Know when respiratory protection should be worn
- Know the types of respiratory protection
- Know how a respirator should fit
- Know how to maintain, clean and store a respirator
- Know inspection requirements
- Demonstrate understanding of requirements for PPE
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Background on Safety and Respirator

- Certain operations within your shop may require the use of a respirator
- OSHA Standard 1910.134 Respiratory Protection, establishes requirements
- 1910.134 requires employers to have a Respiratory Protection Program that is worksite specific
- Always comply with your employer’s program

Source: OSHA 3384-09 2011
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Respiratory Protection Plan

- The plan must be worksite specific and address:
  - Selecting respirators
  - Medical evaluations
  - Fit testing
  - Emergency respiratory use
  - Schedules for cleaning, disinfecting, storing, inspecting, repairing, discarding and maintaining

Checklist from OSHA 3384-09 2011
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Respiratory Protection Plan Continued

- Ensure adequate air quality
- Training in respiratory hazards
- Train in proper use and maintenance of respirators
- Program evaluation
- Ensure employees comply with medical evaluations, cleaning, storing and maintenance requirements
- Have a designated program administrator
- Update the program periodically
- Provide equipment, training and medical evaluations at no cost to employees

Source: OSHA 3384-09 2011
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Typical shop operation examples that should be addressed by the plan may include:

- Welding
- Solvents
- Metalworking Fluids (MWFs)
- Shop Paint & Chemicals
- Abrasive Blasting
- Diesel fumes
- Others?
Background on Safety and Respirator

- OSHA has developed a useful Small Entity Compliance Guide for the Respiratory Protection Standard which is available for free download.

Source: OSHA 3384-09 2011
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An employer may reduce respiratory risks by using:

- Engineering controls, such as: local or general dilution ventilation, change of the work process, isolation or enclosure, or substitution

- Administrative controls, such as: employee rotation, or scheduling major maintenance for weekends or times when few employees are present

Source: OSHA 3384-09 2011
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Assessing the workplace:

- Fumes, vapors and aerosols may cause damage and may require protection.
- Periodic air monitoring should be done to determine where and when respiratory protection is required.
- Where the monitoring indicates protection is required, respiratory PPE or engineering controls will be determined.

Source: OSHA 3384-09 2011
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When should a respirator be worn?

Checklist for permissible practice
☐ Check all that apply

- Checklist from OSHA 3384-09 2011
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When should a respirator be worn?

Employees should be supplied with respirators “when all preferred methods such as engineering controls and administrative controls for protecting them from breathing contaminated air have been determined to be insufficient to reduce the contamination to non-hazardous levels”

Source: OSHA 3384-09 2011
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When should a respirator be worn?

- Where oxygen level is insufficient or potentially insufficient
- If “exposed to harmful levels of hazardous gases or vapors”
- If “exposed to other potential respiratory hazards, such as dust, airborne biological hazards, mists, fumes, sprays, and other airborne particles”

Source: OSHA 3384-09 2011
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Types of respirators:

Air-purifying respirators
Air-purifying respirators, which remove contaminants from the air.

- Half mask Filtering Facepiece
- Dust mask
- APF=10
- Needs to be fit tested

- Half mask Elastomeric Respirator
- APF=10
- Needs to be fit tested

- Full Facepiece Elastomeric Respirator
- APF=50
- Needs to be fit tested

Drawing from OSHA 3384-09 2011
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Types of respirators:

- These types of respirators do not need to be fit tested
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Types of respirators:
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What protection is required for each task?

The employer will determine the type of respiratory protection based on the following criteria:

- The company Respiratory Plan
- Safety data sheets
- Permissible exposure levels (PELS) listed in 1910.1000
- Action Level (AL) $\frac{1}{2}$ of the PEL*
- Assigned Protection Factors (APF)
- Maximum use concentrations (MUC)
- Protection appropriate for the chemical state and physical form of the contaminate

Source: OSHA 3384-09 2011
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What protection is required for each task?

CHECKLIST FOR RESPIRATOR SELECTION

✓ Check that the following has been done at your facility:

☐ Respiratory hazards in your workplace have been identified and evaluated.
☐ Employee exposures that have not been, or cannot be, evaluated must be considered IDLH.
☐ Respirators are NIOSH-certified, and used under the conditions of certification.
☐ Respirators are selected based on the workplace hazards evaluated and workplace and user factors affecting respirator performance and reliability.
☐ Respirators are selected based on the APFs and calculated MUCs.
☐ A sufficient number of respirator sizes and models are provided for selection purposes.

For IDLH atmospheres:

☐ Full facepiece pressure demand SARs with auxiliary SCBA unit or full facepiece pressure demand SCBAs, with a minimum service life of 30 minutes, are provided.
☐ Respirators used for escape only are NIOSH-certified for the atmosphere in which they will be used.
☐ Oxygen deficient atmospheres must be considered IDLH (d)(2)(B)(iii).

For Non-IDLH atmospheres:

Checklist from OSHA 3384-09 2011
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How should a respirator fit?

- Fit Testing
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How should a respirator fit?

- Tight fit – forms a complete seal with wearer’s face
- Loose fit-forms a partial seal

Drawing from OSHA 3384-09 2011
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Fit testing

- Should be conducted by a qualified person

![Fit testing diagram](image)

<table>
<thead>
<tr>
<th>Respirator</th>
<th>QNFT</th>
<th>QLFT</th>
</tr>
</thead>
<tbody>
<tr>
<td>Half Face, Negative Pressure, APR (&lt;100 fit factor)</td>
<td>Yes</td>
<td>Yes</td>
</tr>
<tr>
<td>Full face, Negative Pressure, APR (&lt;100 fit factor) used in atmospheres up to 10 times the PEL</td>
<td>Yes</td>
<td>Yes</td>
</tr>
<tr>
<td>Full face, Negative Pressure, APR (&gt;100 fit factor)</td>
<td>Yes</td>
<td>No</td>
</tr>
<tr>
<td>PAPR</td>
<td>Yes</td>
<td>Yes</td>
</tr>
<tr>
<td>Supplied-Air Respirators (SAR), or SCBA used in Negative Pressure (Demand Mode) (&gt;100 fit factor)</td>
<td>Yes</td>
<td>No</td>
</tr>
<tr>
<td>SCBA - Structural Fire Fighting, Positive Pressure</td>
<td>Yes</td>
<td>Yes</td>
</tr>
<tr>
<td>SCBA/SAR - IDLH, Positive Pressure</td>
<td>Yes</td>
<td>Yes</td>
</tr>
<tr>
<td>Mouthbit Respirators</td>
<td>Fit Testing</td>
<td>Not Required</td>
</tr>
<tr>
<td>Loose-fitting Respirators (e.g., hoods, helmets)</td>
<td>Fit Testing</td>
<td>Not Required</td>
</tr>
</tbody>
</table>

Drawing and Table from OSHA 3384-09 2011
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Use of a Respirator

- Respirators are an effective method of protection against designated hazards when properly selected and worn
- Respirator use should be encouraged, even when exposures are below the exposure limit, to provide an additional level of comfort and protection for workers
- Follow instructions provided by the manufacturer on use, maintenance, cleaning and care, and warnings

Source: OSHA 3384-09 2011
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Use of a Respirator

- Choose respirators certified for use to protect against the contaminant of concern
- NIOSH certifies respirators
- A label or statement of certification should appear on the respirator or respirator packaging
- The label tells you what the respirator is designed for and protection limits
- Keep track of your respirator so that you do not mistakenly use someone else's respirator

Source: OSHA 3384-09 2011
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Improper Use of a Respirator

- If a respirator is used improperly or not kept clean, the respirator itself can become a hazard to the worker
- Do not wear a respirator that fits improperly
- Do not wear your respirator into atmospheres containing contaminants for which your respirator is not designed to protect against:
  - For example, a respirator designed to filter dust particles will not protect you against gases, vapors, or very small solid particles of fumes or smoke

Source: OSHA 3384-09 2011
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Preventing Leaks

- Facepiece seals and valves are important in tight-fitting respirators.
- Tight-fitting respirators should provide a complete seal to the face.
- If there is a leak then the respirator cannot effectively reduce the exposures to respiratory hazards.
- Be sure that nothing interferes with the respirator seal to your face.
- Conduct a user seal check each time you put on a respirator.

Source: OSHA 3384-09 2011

Drawing from OSHA 3384-09 2011
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Preventing Leaks-Conditions that can interfere with the seal or valve include:

- "Facial hair
- Facial scars
- Jewelry or headgear that projects under the face-piece seal
- Missing dentures
- Corrective glasses or goggles or other protective equipment:
  - Face shields
  - Protective clothing
  - Helmets
  - Eyeglass insert or spectacle kits"

Source: OSHA 3384-09 2011
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Seal Checks-

Workers should perform a negative or positive pressure seal check.

For the negative pressure check:
- Cover the respirator inlets (cartridges, canisters, or seals) gently inhale, and hold breath for 10 seconds.
- The facepiece should collapse on your face and remain collapsed

For the positive pressure check:
- Covers the respirator exhalation valve(s), and exhale

Source: OSHA 3384-09 2011
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Seal Checks

- “The facepiece should hold the positive pressure for a few seconds
- During this time, the employee should not hear or feel the air leaking out of the face-to-face-piece seal”

- Instructor to demonstrate in class – select a volunteer
  Demonstrate seal check and proper cleaning
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How should a respirator be cleaned and maintained?

<table>
<thead>
<tr>
<th>CHECKLIST FOR RESPIRATOR MAINTENANCE AND CARE</th>
</tr>
</thead>
<tbody>
<tr>
<td>✓ Check to make sure that your facility has met the following requirements:</td>
</tr>
<tr>
<td>Cleaning and disinfecting:</td>
</tr>
<tr>
<td>□ Respirators are provided that are clean, sanitary, and in good working order.</td>
</tr>
<tr>
<td>□ Respirators are cleaned and disinfected using the procedures specified in Appendix B-2 of the standard.</td>
</tr>
<tr>
<td>Respirators are cleaned and disinfected:</td>
</tr>
<tr>
<td>□ As often as necessary when issued for the exclusive use of one employee.</td>
</tr>
<tr>
<td>□ Before being worn by different individuals.</td>
</tr>
<tr>
<td>□ After each use for emergency use respirators.</td>
</tr>
<tr>
<td>□ After each use for respirators used for fit testing and training.</td>
</tr>
<tr>
<td>Storage:</td>
</tr>
<tr>
<td>□ Respirators are stored to protect them from damage from the elements, and from becoming deformed.</td>
</tr>
<tr>
<td>Emergency respirators are stored:</td>
</tr>
<tr>
<td>□ To be accessible to the work area.</td>
</tr>
<tr>
<td>□ In compartments marked as such.</td>
</tr>
<tr>
<td>□ In accord with manufacturer’s instructions.</td>
</tr>
<tr>
<td>Inspections:</td>
</tr>
</tbody>
</table>

Checklist from OSHA 3384-09 2011
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Cleaning and disinfecting

- Only wear respirators that are clean, sanitary, and in good working order
- Appendix B-2 of the standard covers cleaning and disinfecting procedures
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When to clean and disinfect

- Clean as often as necessary when issued for the exclusive use of one employee
- Clean and disinfect before being worn by different individuals
- Clean and disinfect after each use for emergency use respirators
- Clean after each use for respirators used for fit testing and training

Source: OSHA 3384-09 2011
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Storage

- “Respirators should be stored to protect them from damage from the elements, and from becoming deformed”
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Emergency use respirators
- “Should be accessible to the work area
- Should be stored in compartments marked as such
- Store in accordance with manufacturer’s instructions”
- Cartridges on respirators absorb fumes and therefore should be stored in air tight containers

Emergency use respirators
- Should be certified and documented by inspection, “and by tagging the information either to the respirator or its compartment, or storing it with inspection reports”
Inspections

- “Routine-use respirators should be inspected before each use and during cleaning
- SCBAs and emergency respirators should be inspected monthly and checked for proper functioning before and after each use
- Emergency escape-only respirators are inspected before being carried into the workplace for use”
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Inspections should include

- “Check of respirator function
- Tightness of connections
- Condition of the facepiece, head straps, valves, cartridges, and other parts
- Condition of elastomeric parts”
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Repairs

- “Respirators that have failed inspection should be taken out of service
- Repairs should only be made by trained personnel
- Only NIOSH-certified parts should be used
- Reducing and admission valves, regulators and alarms should only be adjusted or repaired by the manufacturer or a technician trained by the manufacturer”
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Filters and cartridges

- Use only filters, cartridges and canisters that are labeled and color coded with the NIOSH approval label
- Do not remove labels and be sure to keep them legible

Source: OSHA 3384-09 2011
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Module 7 Other PPE?

- Along with respiratory protection, other forms (PPE) should be used.

PPE Used during grinding
Photo from CIANBRO

Source OSHA Quick Card 3260-09N-05
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Eye and Face Protection

- “Safety glasses or face shields are worn any time work operations can cause foreign objects to get in the eye”
- During welding, cutting, grinding using harmful chemicals or when exposed to flying particles
- “Wear when exposed to any electrical hazards, including working on energized electrical systems”
- Eye and face protectors – select based on anticipated hazards

Source OSHA Quick Card 3260-09N-05
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Eye Protection

- Always wear safety glasses!
- Glasses should be ANSI Z87.1 compliant

Source OSHA Quick Card 3260-09N-05
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Foot Protection

- “Workers should wear work shoes or boots with slip-resistant and puncture-resistant soles
- Safety-toed foot wear is worn to prevent crushed toes when working around heavy equipment or falling objects”

Source OSHA Quick Card 3260-09N-05
Hand Protection

- "Gloves should fit snugly"
- "Workers should wear the right gloves for the job"
- Examples:
  - Welding gloves for welding
  - Strong cut resistant gloves when handling steel
  - Gloves cushioned for anti-vibration when grinding
  - Insulated gloves and sleeves when exposed to electrical hazards

Always use gloves for material handling

Source OSHA Quick Card 3260-09N-05
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Head Protection

- “Wear hard hats where there is a potential for objects falling from above, bumps to the head from fixed objects, or head contact with electrical hazards
- Hard hats – routinely inspect them for dents, cracks or deterioration; replace after a heavy blow or electrical shock; maintain in good condition”
- An important part of hard hat protection is the suspension system. Inspect regularly and replace if defective.
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Head Protection

Hard hat and suspension system

Source OSHA Quick Card 3260-09N-05
Hearing Protection

- Use earplugs or earmuffs in high noise work areas
- Clean or replace ear plugs regularly
- Select hearing protection with sufficient decibel reduction
- The higher the NRR the more protection is provided

Hearing protection options
Source OSHA Quick Card 3260-09N-05
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Hearing Protection ear plug installation

- Roll plug into a tight crease free cylinder
- Pull up on ear with opposite arm over your head
- Insert into ear canal
- Properly fit so it is not visible from the front

Ear plug installation
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Learning Activity

Questions?

Photo from OSHA 3686-09 2010