Understanding Asbestos Work

- Grasp the risks
- Methods used to control the risk
- What to expect from contractors working on asbestos removal/cleanup projects
- Don’t bring asbestos home/out of the work area!

OSHA

- Four Classes of Asbestos Related Work Under OSHA
  - Class I through IV
    - Based on level of potential risk
    - Dictates:
      - Work practices
        - Engineering controls
        - Respiratory protection
        - Training requirements
Classes of Work

What Constitutes Class of Work?

- Class I - Removal of TSI and surfacing ACM, and PACM
- Class II – Removal of materials other than TSI of SMs
- Class III – Maintenance and repair of ACM, including TSI and Surfacing
- Class IV – Housekeeping and custodial activities where employees contact, but do not disturb ACM, and cleanup of dust, waste, and debris from Class I, II, or III activities

KEY OSHA Definitions

Competent Person

- Employer shall ensure that all asbestos work performed within regulated areas is supervised by a competent person. (1926.1101(e)(6)
  - Able to identify asbestos hazards.
  - Select appropriate control strategy for asbestos exposure
  - Someone who has the authority to take quick corrective action to eliminate the hazards.
  - The employer must designate the Competent Person.
- Required under 29 CFR 1926.32 (f) for all classes of Asbestos Work (although requirements are reduced for Class III and IV)
Relevant Asbestos Regulations OSHA

➢ What are the responsibilities of the “Competent Person”

• Set up the enclosure
• Ensure the integrity of the enclosure
• Control the entry and exit from the enclosure
• Supervise all employee exposure monitoring
• Ensure that all employees working in the enclosure wear all appropriate PPE
• Ensure that all employees are trained in the use of engineering controls, work practices, and PPE
• Ensure that all employees use the hygiene facilities and follow the decontamination procedures
• Ensure that the engineering controls are functioning properly

Methods of Compliance For ALL Asbestos Work 1926.1101 (g)

➢ Engineering controls and work practices, regardless of levels of exposure (1)

• HEPA Vacuums (i)
• Wet Methods during handling, mixing, removal, cutting, application, and cleanup (ii)
• Prompt clean-up and disposal of wastes and debris in leak tight containers (iii)

➢ Employer shall use control methods to achieve compliance with PEL and EL (2)

• Local exhaust ventilation – HEPA filtered (i)
• Enclosure or isolation of process producing ACM dust (ii)
• Ventilation of reg. area (iii)
Prohibitions (g) (3)

- Activities which disturbs ACM or PACM, regardless of measured levels of asbestos exposure or Initial Exposure Assessment (IEA).
  - High speed abrasive disc’s, saws, or other tools not equipped with point of cut ventilator or enclosures with HEPA filtered exhaust
  - Compressed Air
  - Dry Sweeping, shoveling, or other dry clean-up
  - Employee rotation to reduce exposure

Class I Requirements (g) (4)

- All Class I work including project setup supervised by Competent Person
- If no Negative Exposure Assessment (NEA), employer must ensure that airborne asbestos does not migrate form Regulated Area through use of:
  - Critical Barriers
  - HVAC System Isolation
  - Impermeable drop cloths beneath all removal activity
  - Stationary objects covered
  - Ventilation of Regulated Area with HEPA device – (if no NEA or PEL exceeded)
Class I Requirements

- Specifications (g) (5)
  - Must use one or more of the following:
    - Negative Pressure Enclosure
    - Glove Bag
    - Negative Pressure Glove Bag Systems
    - Negative Glove Box Systems
    - Water Spray System
    - Mini-Enclosures
    - Alternative Control Methods for Class I work
      - Must be evaluated by CIH or LPE qualified as project designer

Requirements of NPE

- Specifications (g) (5) (i) (A)
  - May be of any configuration
  - 4 air changes per hour
  - Minimum of -0.02 column inches of water (negative pressure) shall be maintained by manometric measurements
  - Kept under Negative Pressure throughout use
  - Air movement away from workers, toward HEPA
Work Practices for NPE (B)(1)

- NPE must be inspected for breaches at beginning of each shift (smoke tested)
  - Breaches sealed
  - Testing and results should be documented
- Electrical circuits shall be deactivated, unless equipped with GFCI
  - Power will need to be brought into NPE for vast majority of projects

Glovebag Systems (g)(5)(1)

- Used for removal of PACM and ACM from straight runs of piping, elbows, and other connections
  - Require:
    - 6 mil thick plastic
    - Use of glovebags on elbows and other connections must be designed for that purpose, and used w/o modifications
Glovebag Systems

- Work Practices (g)(5)(ii)(B)(1)
  - Must completely cover the circumference of the pipe
  - Smoke tested
  - Only used once, and not moved
  - May not be used on surfaces that exceed 150 degrees F
  - Must collapse using HEPA vac
  - Prior to use, loose and friable material sealed
  - Disposal bag must be leak tight
  - At least 2 persons shall perform Class I glovebag removals

- Negative Pressure Glovebag Systems (g)(5)(iii)
  - Similar to regular glovebag, with continual use of HEPA vac.

Negative Pressure Glove Box System (g)(5)(iv)

- Used for ACM or PACM pipe runs
  - Constructed with rigid sides
    - Must withstand weight of ACM and water used during removal
    - Negative pressure must be used
    - Air filtration unit attached to box
**Negative Pressure Glove Box System (g)(5)(iv)**

- Used for ACM or PACM pipe runs
  - Back up generator shall be present on site
  - Waste bags shall consist of 6-mil, double bagged
  - 2 persons must perform the removal
  - Smoke tested prior to each use

**Water Spray Process System (g)(5)(v)**

- Used for removal of ACM and PACM from cold line piping
  - Requires additional 40-hours of training in use of system
  - Piping surrounded on 3-sides with rigid framing
  - 360 degree water spray – must form a fine aerosol.
  - All removal within water barrier
  - System operated by 3 persons – only 2 perform removal, 1 monitors function of system
  - Waste bagged while still inside the water barrier

- Not a commonly used system
Mini-Enclosure (g)(5)(vi)

- May accommodate no more than 2 persons
  - 6 mil poly
  - Negative pressure
  - Smoke tested
  - Air movement directed away from breathing zone of worker
  - Can be reused if completely washed with amended water.

Class II Work (g)(7)

- Supervised by Competent person

  - If indoor work:
    - Employer shall use one of the following methods (if no NEA or changes in working conditions)
      - Critical Barriers, or
      - Use of another barrier or isolation method
      - Impermeable drop cloths beneath removal area
      - HEPA Vacuums, Wet Methods, Prompt Cleaning, Disposal in leak tight containers (g)(1) – (g)(1)(iii)
### Class II Work (g)(8)

**Removing vinyl and asphalt flooring materials**

- Specific training for removal tasks, including “Worker Accreditation” EPA Model Accreditation Plan (k)(9)
- Flooring or its backing shall not be sanded
- HEPA Vacs, disposable dust bag, and metal floor tool (no brush) shall be used to clean floors
- Resilient sheeting shall be removed by cutting with wetting of the snip point and wetting during delamination
- Rip-up of resilient sheet floor material is prohibited
- All scraping of residual adhesive/ or backing shall be performed using wet methods
- Dry sweeping is prohibited
- Mechanical chipping is prohibited unless performed in NPE
- Tiles shall be removed intact (unless impossible)
- When tiles are heated and removed intact, wetting not required

---

### Class II Work (g)(8)

**Removal of Roofing Material**

- Roof level HVAC openings shall be isolated
- Roofing shall be removed in an intact state to the extent feasible
- Wet methods used on materials not intact
- Cutting machines continuously misted (unless significant safety hazard)
- When removing built-up roofs with AC roofing flets and an aggregate surface using a power roof cutter, all dust must be collected by HEPA device
- Wastes shall not be dropped or thrown to ground
- Waste materials that are not intact must be removed as soon as possible
  - No later than the end of the work shift
- Intact or Non-Intact materials must be maintained wet or placed in leak tight waste bags – and disposed of promptly
- If less than 25 SF, wet removal not required for roof materials
Class II Work (g)(8)

When removing cementitious AC siding and shingles or transite panels, on building exteriors (other than roofs) the employer shall follow the following work practices:

- Cutting, abrading, or breaking shall be prohibited unless the employer can demonstrate that methods less likely to result in asbestos fiber release cannot be used
- Each panel or shingle shall be sprayed with amended water prior to removal
- Unwrapped or un-bagged panels or shingles shall be immediately lowered to ground via dust covered chute, crane or hoist
- Nails shall be cut with flat, sharp instruments

Class II Work (g)(8)

When performing any other Class II removal of ACM for which specific controls have not been listed, the employer shall ensure that the following work practices are complied with:

- Thoroughly wetted prior to and during removal
- Removed in an intact state
- Cutting abrading or breaking the material prohibited
- Immediately sealed/ disposed of
Class IV Work (g)(10)

Shall be:

- Work must be conducted by trained employees (asbestos awareness)
  - Minimum of 2 hours
- Training must be in conformity with paragraph (k)(9) (employee information and training)
  - Locations of TSI and Surfacing ACM/PACM and AC VFT
  - Recognition of damage, deterioration, and delamination of ACBM.
  - Methods of ID of ACBM
  - Health Effects
  - Relationship of smoking and asbestos exposure
  - Respiratory protection, etc.
- Work must be conducted in conformity with paragraph (g)(1)
  - HEPA vats, wet methods, prompt clean-up
- Employees cleaning up wastes and debris in a regulated area where respirators are required shall wear respirators
- Employees who clean up waste and debris in areas where friable TSI or Surfacing ACM is accessible shall assume all waste and debris as ACM

Hazard Communication

What communication measures are required at entry points?

- Warning signs to identify the regulated area must be posted and must contain the following words;
Hazard Communication

➢ What communication measures are required on waste containers or installed materials?
  • Labels are to be attached to any product containing asbestos and to all waste containers. For installed materials, a label is necessary wherever feasible. The label must contain the following words in black, white, and red in color.

  DANGER, CONTAINS ASBESTOS FIBERS

  CANCER AND LUNG DISEASE HAZARD,

Waste Container Labels

➢ What communication measures are required on containers by NESHAP?
  • Waste generator labels must be attached to all waste containers.
    ✓ Labels must provide generator’s name, location, and city, state, and zip code.
PPE Hazards

Respiratory rates:

- Resting: 5-7 liters per minute
- Working: 25-30 liters per minute
- Exercising: 100-150 liters per minute

Example: worker without a respirator breathing rate of 25 liters per minute

8 hour work time (480 minutes)
2 fibers per cubic centimeter
25,000 cc/min x 480 min x 2 f/cc = 24,000,000 fibers
Even breathing just at the PEL (0.08 f/cc) = 960,000 fibers

Respiratory Protection (h)

Respirator must be worn during:

- Class I Work: At all times
- Class II Work:
  - When ACM is not removed in a substantially intact state
  - When NEA has not been conducted
- Class III:
  - When NEA has not been conducted
  - When TSI or surfacing ACM or PACM is being disturbed
- Class IV:
  - When work performed in RA
- Respirators must be worn during all classes of work involving Emergency Activities
Respirator Selection(h)(3)

- Employers must provide a minimum of ½ mask APR whenever employees perform:
  - Class II or III work for which no NEA
  - Class III work involving TSI or Surfacing ACM
- Employers must provide a tight fitting PAPR or full face piece, SAR (pressure demand) or SCBA whenever employees perform Class I work and there is no NEA, and exposure assessment indicates that the exposure will be at or below 1 f/cc
- If above 1 f/cc, must provide full face SAR (pressure demand) or SCBA

Respirators and Protective Clothing

- Control of respiratory hazards involves:
  - Assessing the hazard
    - Through air monitoring
  - Reducing or eliminating the hazard
    - Through work practices
  - Providing respiratory protective equipment
    - Based on environmental conditions, work activities, and the needs of workers
Respirators and Protective Clothing

- Four categories of respirators:
  - Air Purifying Respirators (APR)
  - Supplied Air Respirators (SAR)
  - Self Contained Breathing Apparatus (SCBA)
  - Combination Respirators

Respiratory Protection

- Respiratory Protection Program
  - Any employer who requires or permits an employee to wear a respirator must have a written respiratory protection program.
  - According to OSHA, the respiratory protection program must include:
    - Must be a written document that spells out the procedures for selection and use of respirators.
    - Respirators must be selected on the basis of respiratory hazards.
    - Users must be trained in the use and limitations of respirators.
    - Respirators should be individually assigned where practical.
    - Respirators will be stored in a sanitary and convenient location.
Respirators and Protective Clothing

➢ Respiratory Protection
  • Respiratory Protection Program
    ✓ Respirators must be regularly inspected (at least monthly).
    ✓ Surveillance of the work area conditions and employee exposure must be maintained.
    ✓ The respiratory program will be routinely reviewed and evaluated.
    ✓ A physician must determine an employee is capable of using a respirator and perform all work duties requiring respiratory protection.
    ✓ Respirators must have the appropriate approval.

Respirators and Protective Clothing

➢ Respiratory Protection
  • Cartridges/Filter
    ✓ Chemical cartridges have a sorbent to absorb a specific chemical or type of chemical.
    ✓ Filters mechanically remove the particles from the air.
  • Filters
    ✓ Named with a letter (N – Not Resistant, R – Resistant, up to one shift, or P – Oil Proof, resistant for more than one shift) and a number (95, 99, or 100) – (Level of Efficiency at 0.3 microns)
    ✓ P100 is Oil Proof, 99.97% Efficient.
    ✓ Formerly a HEPA filter.
Respirators and Protective Clothing

➤ Protection Factors

\[ \text{PF} = \frac{\text{Concentration outside}}{\text{Concentration inside the mask}} \]

Levels provided by NIOSH for Respirators are based on analytical data of typical levels observed.

Respirators and Protective Clothing

➤ Protection factors

<table>
<thead>
<tr>
<th>Respirator Selection</th>
<th>Protection Factor</th>
<th>Recommended max. fiber concentration to remain below 0.01 f/cc</th>
</tr>
</thead>
<tbody>
<tr>
<td>Half face Negative Pressure APR</td>
<td>10</td>
<td>0.10</td>
</tr>
<tr>
<td>Full face Negative Pressure APR</td>
<td>50</td>
<td>0.50</td>
</tr>
<tr>
<td>PAPR tight fitting mask</td>
<td>1,000 (50 in off)</td>
<td>10 (0.50)</td>
</tr>
<tr>
<td>Full Face Continuous Flow Supplied Air</td>
<td>100</td>
<td>1.0</td>
</tr>
<tr>
<td>Full Face Pressure Demand Supplied Air</td>
<td>1,000</td>
<td>10</td>
</tr>
</tbody>
</table>
Respirators and Protective Clothing

➢ Respiratory Protection
  • Respiratory Fit-Testing
    ✓ Two types of fit testing
      ▪ Qualitative
        ° Done with irritant smoke or banana oil
        ° Pass/Fail basis
        ° 8 Exercises: normal breathing; deep breathing; turning head side to side; nodding head up and down; talking; grimace; bending over or jogging; normal breathing
      ▪ Quantitative
        ° Done with a direct reading instrument that measures the concentration inside and outside the respirator
        ° Gives you the degree of protection for that particular make and size respirator
        ° Can NOT be interpreted to give more protection than the assigned respirator protection factor

Respirators and Protective Clothing

➢ Respiratory Protection
  • Respiratory Fit-Checks
    ✓ Respirator must be fit checked each time it is donned
      ▪ Negative-Pressure Fit Check
        ° Done by covering the filters to create a vacuum and partially collapse the face piece
      ▪ Positive-Pressure Fit Check
        ° Done by covering the exhalation valve to create a positive pressure in the face piece
Personal Protective Equipment (PPE)

- Disposable clothing keep gross amounts of suspect asbestos-containing debris off the body and hair.
  - The use of disposable clothing will reduce the chance of bringing asbestos out of the facility and into the home.
  - Putting on Protective Clothing (Class I Activities):
    - Remove all clothing including under garments and jewelry
    - Put on nylon swim suit or disposable under garments if desired
    - Put on disposable (tyvek) coveralls
    - Tape the ankles to take up slack and reduce the risk of trip hazards
    - Inspect respirator; put it on, and conduct fit checks
    - Put on hood over respirator straps
    - Pass through airlocks and shower into contaminated equipment room
    - Put on safety shoes or over boots as required
    - Put on out gloves (leather or cut resistant as needed) and tape wrist seams leaving a “buddy tab” for easy removal
    - Put on additional protective equipment (as needed) i.e. hard hat, fall protection, safety glasses, etc.

PPE and Decontamination

- Removing Disposable Clothing
  - Decontamination must be conducted whenever an employee exits the regulated area.
  - Care should be used when removing disposable clothing. To remove the protective clothing;
    - HEPA vacuum off all debris accumulated on the worker’s garments including boots, outer gloves, and reusable PPE.
    - Use buddy system to mist suit with soapy water to lock down any remaining fibers
    - Remove protective garments and equipment (except respirator) in the dirty equipment room.
    - Disposable clothing and equipment should be placed in asbestos danger bags and labeled as asbestos-containing waste.
    - Non-disposable clothing and equipment should remain in the dirty equipment room, and should not be removed until decontaminated
    - If Class I Work: Proceed into shower, shower both body and respirator, and remove respirator after filters have been soaked with water
    - Proceed into clean room, dry off, dress in street clothing, and disinfect, clean, and inspect respirator.