Asbestos Contractor /Supervisor
Refresher Training Course

This course meets both the OSHA Competent Person requirements and EPA (Asbestos School Hazard Abatement Reauthorization Act) (ASHARA) requirements for an Asbestos Abatement Supervisor

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Chapter 1
COURSE OVERVIEW

- Introductions
- Review of Course Topics
- Pre-Course Quiz

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Chapter 1
COURSE OVERVIEW

About Asbestos:

- The first commercial asbestos mine opened in 1870 in Quebec, Canada.
- More than 1/2 of the buildings built between 1950-1970 contain asbestos.
- Disease and deaths associated with exposure to asbestos fibers are the principle factors behind "The Asbestos Problem"
- Legal problems that followed, and even now continue are also contributing factors
- As a result, the federal government started issuing regulations and guidelines to provide some controls for industrial exposure to asbestos fibers
- These actions, combined with the health and legal issues, prompted the need for asbestos abatement policies

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Chapter 2

BACKGROUND INFORMATION ON ASBESTOS

In this chapter we will review:

- How to recognize the characteristics and various types of asbestos
- Become acquainted with various types of asbestos-containing materials (ACM) found in building applications

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CHARACTERISITCS OF ASBESTOS

Serpentine Group has 1 type of asbestos:

1. Chrysotile
- "White Asbestos" most common type found in buildings in the U.S. (95% use)

Amphiboles Group has 5 types of asbestos

1.Amosite
- "Brown Asbetos" can resist heat up to 80° c
  - 2nd most commonly used type

2.Crocidolite
- "Blue Asbestos" used in high temperature insulation applications
  - rarely found

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CHARACTERISITCS OF ASBESTOS

Amphiboles Group cont' d

3.Anthophyllite
4.Tremolite
5.Actinolite

•These 3 types are of little commercial value
•Occasionally found as contaminants in asbestos-containing materials

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USES OF ASBESTOS

Asbestos has been used in thousands of products, collectively referred to as Asbestos Containing Materials (ACM)

Proved well suited for many uses in the construction industry because of its:

- **Fire resistance**
- **High tensile strength**
- **Poor heat electrical conductivity**
- **Generally impervious to chemical attacks**

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MOST COMMON USES OF ASBESTOS

- **Fireproofing Material**
  - Sprayed on steel beams, columns and decking
- **Strength Enhancer**
  - Found in concrete and concrete-like products
  - Siding and roofing shingles, pipes
  - Added to asphalt, vinyl and other materials to make exterior siding, roofing felts, floor tiles, joint compounds and adhesives
- **Insulator / TSI (thermal system insulation)**
  - Spray applied, trowel applied or factory installed on or within equipment
- **Component of Acoustical Plaster**
  - Troweled or sprayed on ceilings and walls
  - Also used as a decorative product

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FRIABLE vs. NONFRIABLE

The EPA distinguishes between friable and nonfriable forms of ACM

•Friable ACM – easily crumbled into dust

- Contains more than 1% asbestos
- Can be "crumbled, pulverized, or reduced to powder by hand pressure when dry", such as sprayed fireproofing on structural steelwork, or thermal insulation on pipes.
- Is thought to release fibers into the air more readily

- **Nonfriable ACM – difficult to crumble into dust**
- Would present a risk for fiber release only when it is subject to significant abrasion through activities such as sanding or cutting with electric power tools, such as floor tiles, acoustic ceiling tiles, and asbestos cement products.

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CATEGORIES OF ASBESTOS-CONTAING BUILDING MATERIALS

EPA identifies 3 categories of ACM used in buildings:

1. **Surfacing Materials**
   - ACM sprayed or troweled on surfaces for acoustical, decorative, or fireproofing purposes
2. **Thermal System Insulation**
   - Insulation used to inhibit heat transfer or prevent condensation on pipes, boilers, tanks, ducts, and other various components of HVAC systems
3. **Miscellaneous Materials**
   - Other, largely nonfriable products and materials such as floor tile, ceiling tile, roofing felt, concrete pipe, outdoor siding and fabrics

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CATEGORIES OF ASBESTOS-CONTAING BUILDING MATERIALS

The EPA requires that the asbestos content of suspect materials be determined by collecting bulk samples, and analyzing them by PLM.

•It is often possible to "suspect" that a material or product is or contains asbestos by looking at it, but actual determinations can only be made by instrumental analysis.

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Chapter 3

HEALTH EFFECTS

In this chapter we will review:

- **The means by which asbestos can enter the body and cause damage.**
- **The major diseases associated with asbestos exposure.**
- **The concept of latency period, or length of time between exposure and the onset of disease.**
- **The relationship between cigarette smoking and asbestos exposure.**
- **The risks associated with asbestos exposure, or how likely disease will occur.**
- **How to recognize the need for medical surveillance and when it is necessary.**

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ADVERSE HEALTH EFFECTS

The adverse health effects of asbestos associated with asbestos exposure have been extensively studied for many years. Results of the studies have shown that:

- Inhalation of asbestos fibers may lead to increased risk of developing one or more diseases
- The majority of workers that have died from asbestos exposure were employed in the mining, milling. Manufacturing and insulating industries

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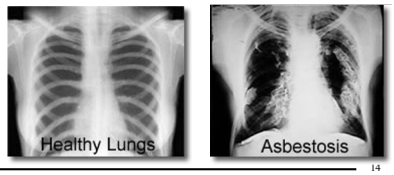
ASBESTOSIS

Asbestosis is a disease characterized by the fibrotic scarring of the lung. This is a restrictive lung disease that reduces the overall volume of the lung.

- Common symptom is shortness of breath.
- Dose related relationship between asbestos exposure and developing the disease.
- Latency period for asbestosis is 15-30 years.



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LUNG CANCER

There are many causes of lung cancer, including asbestos and cigarette smoking.

- Employees exposed to industrial concentrations of asbestos have a 5x greater chance of getting lung cancer.
- A person that smokes cigarettes, with no asbestos exposure is 10x more likely to get lung cancer.
- **A cigarette smoker that also works with asbestos is 50x more likely to get lung cancer.**
- The latency period between initial asbestos exposure and the occurrence of lung cancer is typically 20 years.
- Dose-response relationship between asbestos exposure and lung cancer, but a "safe level" has not been determined

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MESOTHELIOMA

- **Mesothelioma is a cancer of the chest cavity lining (mesothelium), called pleura mesothelioma.**
- **Mesothelioma can also occur in the lining of the abdominal cavity, called peritoneal mesothelioma.**
- **Mesothelioma spreads very rapidly and is always fatal.**
- **This asbestos- related disease is the greatest concern, but fortunately is also the rarest.**
- **Has no dose-response relationship; can happen with limited exposure.**
- **Latency period is 20-40 years after initial exposure.**

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OTHER DISEASES

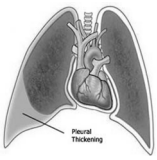
Several other disease are found more often among persons exposed to asbestos:

•Cancer of the esophagus, stomach, colon and pancreas

•Pleural plaques calcification of the lining of the lungs, chest wall or diaphragm

•Pleural thickening scarring on the pleura (membrane of lung and chest cavity). The scarring is irreversible and causes reduced lung function in the sufferer.

•Pleural effusion A pleural effusion is a buildup of fluid between the layers of tissue that line the lungs and chest cavity.



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RISKS ASSOCIATED WITH LOW LEVEL ASBESTOS EXPOSURE

Asbestos is known to be hazardous based on studies of asbestos workers and laboratory animals. However, the risks associated with low level, non-occupational exposure (occupants of buildings containing ACM) are not well established.

The EPA concludes that there is NO SAFE LEVEL of asbestos exposure under which the risk of contracting asbestos diseases is zero.

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Chapter 4

RESPIRATORS and PROTECTIVE CLOTHING

In this chapter we will review:

- **The need for effective respiratory protection for asbestos abatement personnel.**
- **Understand the categories and operating principles of respirators used for protection against asbestos.**
- **Recognizing the use and limitations of various types of respirators.**
- **Understanding the importance of properly fitting the respirator.**
- **The concept of protections factors and how they relate to respirator selection and use.**
- **Understanding the basic requirements of an effective respiratory protection program.**
- **Recognizing the need for and proper use of protective clothing and equipment.**

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RESPIRATORY SYSTEM

There are 3 ways that hazardous materials can enter the body:

1. **Through the mouth**
2. **Through the skin; and**
3. **Through the respiratory systems**

The control of respiratory hazards often involves 3 steps:

•Assess the hazard
•Reduce or eliminate the hazard; and
•Provide Respiratory Protective Equipment

Appropriate respiratory protection is provided based upon the environmental conditions, work activities, and the needs of the workers.

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CATEGORIES OF RESPIRATORS

- **Air-Purifying**
- **Supplied-Air**
- **Self-Contained Breathing Apparatus(SCBA)**
- **Combination respirators**

There are many different types of respirators in each of the four categories, however, they are not all appropriate for protection against asbestos.

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RESPIRATORY PROTECTION PROGRAM

- OSHA asbestos standards and general respiratory protection standards require that Contractors have a comprehensive, written respiratory protection program.
  - OSHA regulations detail what must be included in a written program
- Every employer needs to establish a clear, concise policy regarding the use of respirators
- A program administrator must be designated by name and is responsible to oversee the program

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RESPIRATOR SELECTION

The selection of an appropriate respirator generally involves 3 steps:

- Identifying the hazards
- Evaluating the hazards
- Providing proper respiratory protective equipment to suit the conditions and the individual

Respirator selection and the respiratory program must conform to OSHA standards and guidelines published by respiratory manufacturers.

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APPROVED RESPIRATORS - NIOSH

The National Institute for Occupational Safety and Health (NIOSH) is the OFFICIAL testing and approval agency for respirators and cartridges.

- If the entire respirator assembly including face piece, filters, hoses, and airlines pass the NIOSH criteria, then NIOSH issues an approval

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PROTECTION FACTORS

- Respirators offer varying degrees of protection against asbestos fibers. The key to understanding the difference between types, one must understand the concept of a protection factor (PF)
- The protection factor is defined as the concentration of a contaminant measured outside the mask divided by the concentration you would expect to find inside the mask:

$$PF = \frac{\text{Concentration Outside Mask}}{\text{Concentration Inside Mask}}$$

- The actual level of protection depends greatly on the fit of the mask to the wearer's face, and will be different for each person.

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PROTECTION FACTORS

- Depending on the classification of asbestos activity, OSHA construction standard permits levels ranging from 0.01 fibers per cubic centimeter (f/cc) to .01 f/cc inside the respirator. A level of 0.01 f/cc is generally considered the maximum desired level inside the mask.

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PROTECTION FACTORS

Assigned Protection Factors (APF)

•The workplace level of respiratory protection that a respirator or class of respirators is expected to provide employees when the employer implements a continuing, effective respiratory protection program as specified by 29CFR 1910.134

Maximum Use Concentrations (MUC)

•The maximum atmospheric concentration of a hazardous substance from which an employee can be expected to be protected when wearing a respirator, and is determined by the assigned protection factor of the respirator or class of respirators and the exposure limit of the hazardous substance

Permissible Exposure Limit (PEL)

•The maximum allowable concentration level of a contaminant in the air to which an individual may be exposed fir a time weighted average for an 8 hour day, 40 hour work week, set by OSHA

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MEDICAL APPROVAL

Only those individuals who are medically capable to wear respiratory protective equipment shall be issued a respirator.

- Each employee must be medically evaluated before a respirator is used on the job.
- Medical status must be re-evaluated annually

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EMPLOYER TRAINING PROGRAM

Each worker designated to wear a respirator must receive adequate training.

- Training sessions should be conducted by a qualified individual to ensure that employees understand the limitations, use and maintenance of respiratory equipment

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RESPIRATOR FITTING

The OSHA Respiratory Protection Standard (29CFR 1910.134) requires that the fit of all tight-fitting respirators; either required to be worn by an OSHA standard, or required by the employer, be fit-tested.

- Fit testing is required prior to initial use and at least annually thereafter
- Fit testing must also be performed when there is a noticeable change to the employees physical condition
- Fit testing falls into 2 major categories:
  - Qualitative (pass or fail test)
  - Quantitative (measurement of contaminant levels inside the mask)

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RESPIRATOR FITTING - USER SEAL CHECK

OSHA also requires that the fit of the respirators be checked EACH TIME the respirator is worn, according to manufacturer' s instructions. This is called a user seal check.

- Negative pressure seal check
- Positive pressure seal check

Once the wearer has successfully passed the negative and positive pressure fit checks, the actual fit test may be conducted.

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RESPIRATOR FITTING - QUALITATIVE FIT TESTING

Involves the use if contaminants and test exercises to determine whether a respirator' s fit is sufficient.

- If the wearer detects the contaminant during the fit testing exercises, the respirator fit is deemed not sufficient and not approved.
- If the contaminants are not detected during the fit testing exercises, the respirator fit is deemed satisfactory until the next fit test.

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RESPIRATOR FITTING - QUANITATIVE FIT TESTING

Requires specialized equipment to measure differences in airborne particulate concentrations and a trained tester.

- The airborne concentration of particulate is measured both outside of and inside the respirator while a worker performs several exercises.
- The specific degree of protection - fit factor - is determined for the wearer with the specific respirator worn.
- Minimum fit factor required for half mask is 100, full face is 500. These levels must be achieved or surpassed during the test exercise

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RESPIRATOR FITTING - FIT TEST METHOD SELECTION

- **Determining which method to use is based on test quality and costs**
- **Quantitative testing is viewed as better than qualitative testing**
- **OSHA has fit test protocol requirements based on the type of respirator**

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CARING FOR RESPIRATORS

Routine Inspection:

Respirators should be inspected before and after each use.

For powered air-purifying respirators, check:

- Face piece
- Head Straps
- Valve
- Breathing tube
- Hood or helmet, check for
  - Headgear suspension
  - Cracks or breaks in face shield

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CARING FOR RESPIRATORS

Routine Inspection:

For supplied air respirators, check:

- Face piece, head strap and valves
- Breathing valves should be checked for
  - Cracks
  - Missing or loose hose clamps
  - Broken or missing connectors
- Hood, helmet or suit should be checked for
  - Headgear suspension
  - Cracks or breaks in face shield
  - Rips and torn seams
- Air supply systems should be checked for
  - Breaks or kinks in hoses and end fitting
  - Tightness of connections
  - Proper setting or regulators and valves
  - Correct operation of air purifying elements and carbon monoxide or high-temperature alarms

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CARING FOR RESPIRATORS

Routine Inspection:

For SCBA (self-contained Breathing Apparatus, consult manufacturer's literature

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CARING FOR RESPIRATORS

Maintenance and Repair of Respirators

At some point any respirator will need replacement parts or some other repair.

- Only trained, qualified persons can LEGALLY repair respirators.
- Respirator parts from different manufacturers are NOT interchangeable
- NIOSH approval is invalidated if parts are substituted or non-approved parts are used.

Respirator Storage

- Respirators must be protected from dust, sunlight, heat, extreme cold, excessive moisture and damaging chemicals.
- When not in use, place in a closed bag and store in a clean and sanitary location.

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RESPIRATORS

Surveillance of Working Conditions

•Employer must provide adequate surveillance of employees' working conditions to be certain the respirator selected provides adequate protection.

Respirator Program Evaluation and Recordkeeping

•Employer is responsible for evaluating the program at least once a year.
•Employer should also review compliance with all aspects of the program
•Records need to be kept, to include:

- Names of employees trained in respirator use
- Documentation of care and maintenance
- Medical reports
- Test results
- Instances of any problems specific to respirator use

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PROTECTIVE CLOTHING

Protective clothing is worn to keep gross amounts of asbestos debris off the body, hair, etc.

- Using protective clothing and showers will minimize the chance of taking asbestos home with you
- Minimize the chance of rashes and discomfort caused by the material being removed

Protective clothing normally worn by asbestos abatement workers includes:

- Disposable coveralls, foot coverings and head coverings
- Tightly fitting nylon swimsuit or disposable undergarments
- Waterproof safety shoes/boots (as required)
- Hard hat (as required)
- Protective gloves
- Eye protection

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PROTECTIVE CLOTHING

- Each worker must use a new coverall EACH TIME he/she enters the work area.
  - Assuming two breaks and a lunch period, 4 coveralls would be needed each day, by each worker.
- Additional coveralls are needed for authorized visitors, and to replace any that have torn or become damaged
- You can estimate the number of suits needed using this formula:

  5 x number of workers x projection duration in days = number of suits needed

  example: 5 x 9 workers x 48 days = 2160 suits

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OTHER PERSONAL PROTECTIVE EQUIPMENT (PPE)

Additional protective equipment may be needed depending on the specific project, most commonly:

- Eye protection
- Hard hats
- Safety shoes
- Hearing protection

PROTECT YOURSELF!
Never work without your respirator and PPE

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Chapter 5

ESTABLISHING A TYPE-C SUPPLIED AIR SYSTEM

In this chapter we will review:

- The reasons for using air-supplied respirators
- Breathing air must be processed and not simply pumped
- The mechanism by which air is compressed and purified
- The need for air storage banks and proper air delivery to the worker
- Regulations and recommended practices for providing breathing air

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TYPE-C SUPPLIED AIR SYSTEM

Good practices generally require the use of type C supplied-air respirators on any asbestos removal job.

A type C supplied-air system normally consists of a:

- Compressor
- Air delivery lines
- Air cleaning apparatus
- A reserve air supply
- NIOSH approved masks

And should provide:

- Continuous supply of Grade D air
- NIOSH approved respirators and supply hoses
- Adequate reserve for escape time
- Breathing air temperature control
- Continuous monitor and alarm for carbon monoxide

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GRADE D AIR

The minimum quality for routine use in supplied-air breathing equipment.

Grade D Breathing Air Requirements

Characteristics

Oxygen	19.5% - 23.5%
CO	10 ppm, maximum
CO2	1000 ppm, maximum
Condensed Hydrocarbons	5 mg/m3, maximum
Objectionable Odors	None
Water Vapor	varies

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AIR PROCESSING

A properly established type C supplied-air system does not simply pump air to the worker.

- Air must be processed, as well as heat and water vapors
- As the air is compressed the temperature rises
- Heat needs to be removed from the compressed air so when it reaches the worker it is cool and comfortable
- Air processing equipment must also remove moisture from the supplied air

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AIR PROCESSING

- The contractor should become fully knowledgeable on the use, limitations, and maintenance of the supplied-air system
- Thorough training on use and good practices of the supplied-air system is necessary for the asbestos abatement workers

Any air-line respirator chosen must be approved by NIOSH

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Chapter 6

ESTABLISHING A MEDICAL SURVEILLANCE PROGRAM

In this chapter we will review:

- The need for an ongoing medical surveillance program
- The various elements that comprise an acceptable program
- OSHA standards regarding respirator use
- Medical monitoring, including tests and test results
- The procedures for maintaining appropriate records on each employee

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IMPORTANCE OF MEDICAL SURVEILLANCE

Establishing an ongoing medical surveillance program is important for:

- The health & safety of workers
- Regulatory requirements
- Legal liability concerns

Implementation of a solid program will enable an abatement contractor to:

- Verify every employee's medical status at a particular time
- Comply with OSHA standards
- Reduce other possible liability risks

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WHO NEEDS MEDICAL SURVEILLANCE

Asbestos abatement contractors are required to provide medical surveillance for:

- Asbestos abatement employees that engage in Class I, II and III work for 30 or more days per year
- Employees exposed at or above the PEL or EL
- Employees that wear negative pressure respirators
- Other employees (such as custodial, maintenance workers) who may encounter and/or disturb ACM while performing their normal duties

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OSHA STANDARDS

OSHA asbestos standards

- 29 CFR 1910.1001- general employees
- 29 CFR 1915.1001- shipyard employees
- 29 CFR 1926.1101- construction and abatement workers

OSHA requires pre-placement exams before an employee starts an asbestos job, to include:

- Comprehensive medical evaluation
- Medical questionnaire/history
- Pulmonary function tests
- Chest x-ray (optional at physician's discretion) are strongly recommended

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MEDICAL EXAMINATIONS

- Results of the required examination are used to determine the employee's baseline health status, as well as determining if the employee is capable of safely working under the requirements of the contractor.
- Employer must also obtain a statement from the physician indicating whether or not the employee is capable of wearing a respirator
- Employer must retain examination results on file for the duration of employment PLUS 30 years
- OSHA requires that every employer provide, or make available, annual medical examinations
- Annual examinations are required for all workers enlisted in a medical surveillance program
- Within 30 calender days before or after the termination of an employee, OSHA requires that the employee exposed to asbestos receives a medical examination

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SPECIFIC TESTS

All tests performed during the medical examination are required for your health and safety.

- Pulmonary History - potential for respiratory diseases
- Physical Examination - overall health
- Pulmonary Function Tests - lung health
- Chest X-Ray - detects any irregularities in the lungs or heart

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Chapter 7

PRE-WORK ACTIVITIES AND CONSIDERATIONS

In this chapter we will review:

- What to look for during the pre-bid walkthrough survey of the job site.
- Job site conditions and how they affect specifications.
- Good techniques for screening & selecting abatement employees.
- The type of information that needs to be covered in a training program for employees.
- The design and use of a project logbook during an asbestos abatement job

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PRE-WORK ACTIVITIES

Never bid or accept a project without first viewing and assessing the site. There is valuable information to be gained during a site assessment:

- Size of the job, with consideration to configuration, accessibility, irregularities
- Basis to formulate an effective strategy for removal and/or control
- Existing damage or potential problems

Additionally an abatement contractor will need to look for these important items

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PRE-WORK ACTIVITIES

During the pre-bid survey, an abatement contractor will need to look for these important items:

- Analytical results of bulk samples
- Inspect the nature of the ACM
- Check the accessibility of the material
- Check for difficulty of isolating the work area
- Determine is areas adjacent to abatement activity will be occupied
- Determine room volume and natural air movement in the work area
- Check items requiring special protection
- Determine contractor's responsibility concerning moveable objects
- Note any materials or equipment that will require special handling
- Note stationary objects that require special attention

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PRE-WORK ACTIVITIES

- Utilities
- Existing damage
- Safety considerations
- Work area configuration
- Air monitoring
- Time for job completion

This is not a list of ALL the special considerations that need to be examined, rather a common list of concerns that should be investigated before beginning any asbestos abatement job.

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MEDICAL SURVEILLANCE

Contractors are required as employers to provide, at no charge to the employee (if exposed to asbestos) a physical examination by a qualified physician, as discussed in the previous chapter, "Establishing a Medical Surveillance Program"

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EMPLOYEE TRAINING

Any worker who will be in or around an asbestos abatement work area has to be trained in how to adequately protect themselves from exposure during the course of the project, and be trained in correct job procedures for each of their positions.

- AHERA and ASHARA require that all response action workers and supervisors attend an EPA approved (and state approved when applicable) training course and pass an exam.
- OSHA also has specific training requirements based on the type of work being performed, and requires respirator training

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THE PROJECT LOGBOOK

Prior to the start of any asbestos abatement project, a logbook should be established, and should include:

- Employee's medical reports
- Copies of any accident or injury reports
- Unusual events or occurrences
- Air sampling results
- Notes concerning any deviation from standard work practices
- Sign in sheets
- Training documentation
- Other pertinent documents and information

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THE PROJECT LOGBOOK

The logbook serves many important functions:

- Easy reference for projects
- Future project reference
- Possible protection for liability issues that may arise

Logbook should be well organized, and must include all records. It is usually maintained by the site supervisor and includes:

- Pre-work papers
- Contract specifications
- Personnel
- Sign in sheets
- Subcontractors
- Air monitoring
- Waste disposal
- Daily inspection reports
- Other handout materials
- Upon conclusion, a one page summary of the project is also suggested

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Chapter 8

GLOVEBAG TECHNIQUES FOR REMOVAL OF PIPE INSULATION

In this we will review:

- The concept of localized glovebag removal
- The necessary materials to perform the job
- The importance of proper pipe lagging preparation
- The basic procedures and sequence for glovebag operations
- Necessary precautions, work practices and PPE
- Proper clean up and disposal of asbestos containing waste generated by this technique.

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TYPICAL GLOVEBAG PROJECT

- Two people should perform the glovebag removal project. A third person is often available to assist with supplies, keep unwanted visitors out of the work area, and possibly conduct the air monitoring.
- Before any work begins, all materials and supplies should be brought into the work area.
- Work area should be roped off and signs posted.
- HVAC system serving the area should be shut down.
- Know the temperature of the pipe you're working on.
- ***OSHA DOES NOT ALLOW the use of glovebags on pipes where the surface temperature is greater than 150° F***

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REMOVAL PROCEDURES

REMOVAL PROCEDURES WILL BE DETAILED, AND ARE BEST EMPHASIZED DURING THE HANDS-ON SECTION OF THE TRAINING COURSE.

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OTHER SYSTEMS

Under the revised OSHA asbestos standards for the construction industry, OSHA also identifies other systems that are permitted for Class I activities. These include:

- Negative pressure glovebox systems
- A water spray system
- Mini-enclosures

(Requirements for the use of each of these are provided in the regulations)

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Chapter 9

PREPARING WORK AREA & ESTABLISHING THE DECONTAMINATION UNIT

In this chapter we will review:

- Objectives of work area preparation.
- The sequence and methods for accomplishing tasks in work area preparation.
- The functions of a decontamination unit.
- The basic construction of a decontamination unit.
- The necessary materials and equipment used for prepping the work area and building a decontamination unit.

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PREPARING THE WORK AREA

Each project has unique requirements for effective preparation. The following steps are general guidelines that can be modified to address specific problems encountered on an asbestos abatement project.

PROCEDURES WILL BE DETAILED, AND ARE BEST EMPHASIZED DURING THE HANDS-ON SECTION OF THE TRAINING COURSE

Step 1

Conduct Walkthrough Survey of the Work Area

- Contractor, building owner and project designer to inventory the ACM, note any special conditions, photograph any existing damages

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PREPARING THE WORK AREA

Step 2

Post Warning Signs

- Signs should be posted at each entrance and exit, and positioned so any person would notice the warning before entering the area and would be able to take necessary protective actions.
- Must comply with OSHA standards

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PREPARING THE WORK AREA

Step 3

Shut down the HVAC System

- The control panel should be tagged and locked.
- Personnel need to be warned not to activate any control panels.
- Vents and air ducts need to be sealed
- HVAC filters should be removed and disposed of in the same manner as other ACM

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PREPARING THE WORK AREA

Step 4

Clean/remove non-stationary items from the work area

- Objects should be first vacuumed with a HEPA vac and cleaned with amended water, or with plain water if applicable
- Non-stationary items should be removed from the work area
- Drapes should be removed for cleaning or disposal
- Contaminated carpets should be disposed of in the same manner as other ACM

Step 5

Cover and seal stationary items with poly

- Securely taped with duct tape or plastic tape to achieve an air-tight seal around the object.
- Using 2 layers of poly is a good recommended practice

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PREPARING THE WORK AREA

Step 6

Apply critical barriers

- Windows and doors
- Floor
- Walls
- Light fixtures

Step 7

Locate and secure the electrical system

- De-energize electrical circuits
- Lock and tag the breaker box
- Make provisions for supplying the work area with electricity from outside the work area, to include a GFI
- If electrical supply cannot be disconnected, energized parts must be insulated or guarded from employee contact

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PREPARING THE WORK AREA

Step 8

Secure the work area

- Work area should be secured to prevent contamination from spreading beyond the work area

Step 9

Establish a decontamination (decon) unit - 3 rooms

- Clean room
- Shower room
- Equipment room

- Can be built on site, or could be portable

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PREPARING THE WORK AREA

Step 10

Establishing a waste load-out area

- Is separate from the decon unit and not used for personnel egress
- Used as short term storage area for bagged waste and as a port for transferring waste to the truck
- An enclosure can be constructed to forma n airlock between the exit of the load-out area and an enclosed truck.

Mini-Enclosure

- Usually a sealed, poly enclosure around a work area.
- Used to protect the facility environment as a secondary means to help, or attempt to, contain fibers or debris generated during work
- 2 workers should be used to set up and operate a mini-enclosure
- Set up with a negative pressure system

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Chapter 10

CONFINING AND MINIMIZING AIRBORNE FIBERS

In this chapter we will review:

- The primary methods used to contain and minimize airborne fiber concentrations
- Containing and minimizing airborne fiber concentrations during an abatement project
- Principles and procedures for setting up a negative air filtration system
- The use and limitations if negative air filtrations
- The application and use of wet removal techniques
- Proper procedures and equipment for removal of sprayed-on and troweled-on friable insulation material
- Proper procedures and equipment for removal of asbestos containing insulation from pipes, tanks and boilers

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CONFINING & MINIMIZING AIRBORNE FIBERS

The primary methods for containment control are the use of wet removal techniques and the use of negative pressure filtration systems accompanied by continuous clean up in the work area sealed with polyethylene (poly)

2 Main Negative Pressure Goals:

- Changing air within the containment area at a minimum of 15 minutes while filtering the exhausted air through HEPA filters
- Establishing conditions in which air from all portions of the sealed zone is being pulled toward the negative pressure fans and HEPA filters.

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NEGATIVE PRESSURE FILTRATION SYSTEMS

A negative pressure system is one in which the static air pressure in an enclosed work area is lower than that of the environment outside the containment barriers.

Negative pressure systems should be used to accomplish several positive effects:

- Containment of airborne fibers even if the barrier is ripped or torn
- Lower concentration of airborne fibers in the work area
- Worker comfort and increased productivity
- Improved efficiency in final cleanup

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MATERIALS & EQUIPMENT

The Portable, HEPA-Filtered, Powered Exhaust Unit

- Establishes lower air pressure inside the contained work area by moving air to the outside of the work area
- Structural specifications
  - Should be rugged and durable, and mounted on wheels for easy movement
  - Should be less than 30" to fit through doorways
  - Should have appropriate seals
  - Should have easy access to all air filters from the intake end and filters must be easy to replace
- Mechanical specifications
  - Fans should be sized appropriately, and have air handling capacity of at least 1,000 to 2,000 CFM (cubic feet per minute)
  - Large scale projects may benefit from a unit with a specially designed exhaust system

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MATERIALS & EQUIPMENT

- Filters
  - Final filter must be HEPA
  - Each filter should have a standard nominal rating of at least 1,100 CFM with a maximum pressure drop of 1 inch H_20 clean resistance
  - A continuous rubber gasket must be located between the filter and the filter housing to forma tight seal
  - Each filter should be individually tested and certified by the manufacturer, and bear a UL586 label
- Instrumentation
  - Each unit should be equipped with a Magnehelic gauge or manometer to measure pressure drop across the filters
- Electrical
  - L General
  - Fans
  - Instrumentation

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VENTILATION REQUIREMENTS

- When determining approximate ventilation requirements for a work area, the number of units needed is determined by dividing the total CFM by the related capacity of the exhaust unit.
- It is recommended minimum rate of one air change every 15 minutes, or four air changes per hour.
- Total volumetric airflow requirement (in ft^3/min) for the work area is determined by dividing this volume by the recommended air change rate (i.e., one air change every 15 minutes)

  Total ft^3/min = volume of work area in ft^3 / 15 min

- The number of units needed for the application is determined by dividing the total ft^3/min by the rated capacity of the exhaust unit

  Number of units needed = $\frac{\text{Total } ft^3/min}{\text{Capacity of unit } (ft^3/min)}$

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NEGATIVE AIR MACHINES

- Always test the system before ACM removal procedures are initiated (The plastic curtains of the decon facility should move slightly in toward the work area)
- The units should not be turned off at the end of the work shift or when removal operations temporarily stop.
- Filters in the exhaust system should not be replaced after final clearance sampling is complete in order to avoid any risk of recontamination
- Average filter life:

  2 hours - 1/2" pre-filter
  24 hours - 2" pre-filter
  500 hours - 12" pre-filter

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Chapter 11

SAFETY AND HEALTH CONSIDERATIONS OTHER THAN ASBESTOS

In this section we will review:

- Electrical safety hazards
- Proper procedures and equipment used during asbestos abatement to avoid hazardous conditions and work practices
- Potential fire/life safety hazards
- Emergency action plans/procedures specific to the abatement project
- Hazards associated with ladders, scaffolds, walking and working surfaces
- Basic provisions of OSHA's Hazard Communication Standard

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SAFETY & HEALTH CONSIDERATIONS

Safety hazards can manifest if good work practices are not followed.
Potential hazards include:

- Electrical
- Ladders & scaffolding
- Working surfaces
- Fire
- Heat related disorders
- Body protection

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ELECTRICAL SAFETY & HEALTH CONSIDERATIONS

Electrical Safety Hazards

- Incorrect wiring, improper grounding and lack of proper shielding results in approximately 1,000 people per year being fatally electrocuted.
- Many of these deaths result from contact with ONLY 120 volts a.c.
- In addition to obvious shock potential, many deaths result from falls after a non-fatal electrical shock.

Pre-Work: Identifying the Hazards

- Identification of wiring faults in the building
- Uninsulated or exposed and energized wiring or equipment
- Occupied building
- Providing power inside the removal area
- Other electrical devices commonly found on abatement projects

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ELECTRICAL SAFETY & HEALTH CONSIDERATIONS

Basic Considerations

- Use non-conductive tools
- Avoid stringing electrical wire on the floor
- Do not allow water to accumulate on the floor
- Ensure electrical equipment is grounded and use GFI circuits
- Use fiberglass ladders
- Special requirements for circuits over 600 volts
- Always perform a pre-work walkthrough to identify potential electrical hazards

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LADDER / SCAFFOLDING / WALKING - WORK SURFACES SAFETY & HEALTH CONSIDERATIONS

Inspections and Proper Use - Ladders

- Inspect ladders on a regular basis to make sure they are in good condition
- Do not use defective ladders, or ladders with improvised repairs
- Secure ladders to prevent displacement during use
- Make sure safety feet spreaders are in good shape

Inspections and Proper Use - Scaffolding

- Perform proper setup, regular inspection and basic maintenance
- OSHA standards for free-standing, mobile scaffolding
- Keep debris and other obstacles off the floor where scaffolds are being used
- Use guardrails - required when scaffolding is 4-10ft tall and less than 45" wide
- Secure planking to the frame with cleats

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SLIPS, TRIPS AND FALLS SAFETY & HEALTH CONSIDERATIONS

The National Safety Council estimates there are 200,000-300,000 disabling injuries in work-related falls each year. Over 40% of those disabled workers are in the construction industry.

Be aware of your work environment:

- Consider the height of the work, equipment and trip hazards
- Disposable booties may be impractical on some jobs. Seamless rubber boots, shoes with non-skid soles may be a better alternative
- Inspect ladders, scaffolding and railings for condition and adequacy
- Minimize water on floors
- Use care around air lines and electrical cords
- Suspend electrical lines and cords, when possible, using tape
- Minimize debris on floors
- Pick up your work area
- No running, jumping or horseplay

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FIRE SAFETY & HEALTH CONSIDERATIONS

Fire prevention/control should be given a high priority both during planning and removal stages of asbestos projects.

- Exits, Travel Distances, Emergency Lighting and Alarm Systems

To avoid fire problems in asbestos control areas:

- Ensure that all sources of ignition are removed
- Locate "hot spots"
- Cut off supply to steam lines, electric and steam heaters and radiators
- Do not allow lighters, matches, etc. into the work area
- Strictly enforce No Eating, No Drinking, No Smoking inside the work area
- When using a torch to cut pipe, etc., post a fire watch with appropriate fire extinguisher such as pressurized water.
- DO NOT USE CO_2 extinguishers in confined or enclosed spaces

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FIRE
SAFETY & HEALTH CONSIDERATIONS

To avoid fire problems in asbestos control areas (cont'd):

- Reduce the amount of flammable/combustible materials inside a space prior to hanging plastic
- Mark exits, post directional arrows, provide lighting of exit routes
- Choose emergency exits that are locked from the outside but can be opened from the inside
- Address fire hazards in your emergency action plan for the site
- Be alert for flammable vapors
- Have a telephone available on site, at all times
- Post local fire/police phone numbers to be used as a back up to 911 service
- Ensure you have a monitor outside the work area AT ALL TIMES trained in emergency procedures

OSHA requires a written emergency plan and fire prevention plan.
Requirements are detailed in 29 CFR 1910.38

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HEAT RELATED DISORDERS
SAFETY & HEALTH CONSIDERATIONS

Heat-Related Disorders:
Heat Exhaustion & Heat Stroke

Heat exhaustion is less serious than heat stroke, and happens when you lose a lot of water, and sometimes salt, from sweating.

Some signs of heat exhaustion are:

- Fatigue
- Weakness
- Profuse Sweating
- Normal temperature
- Pale, clammy skin
- Headaches
- Cramps
- Vomiting
- Fainting

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HEAT RELATED DISORDERS
SAFETY & HEALTH CONSIDERATIONS

Heat Exhaustion Treatment

- Medical Alert
- Remover worker from hot area
- Have worker lie down and raise feet
- Apply cool, wet cloths
- Loosen or remove clothing
- Allow small sips of water or Gatorade™ if victim is not vomiting

Prevention

- Frequent breaks away from heat
- Increase fluid intake
- Allow workers to become acclimatized to heat
- External cooling

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HEAT RELATED DISORDERS
SAFETY & HEALTH CONSIDERATIONS

Heat Stroke

Heat stroke happens when your body can't control its temperature. You actually stop sweating.

Some signs are:

- Hot, dry skin
- Severe headache
- Dizziness
- Nausea
- Confusion
- Collapse
- Delirium
- Coma
- Death

Heat stroke can kill you or cause permanent brain damage.

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HEAT RELATED DISORDERS
SAFETY & HEALTH CONSIDERATIONS

Heat Stroke Treatment

- Medical EMERGENCY
- Remover worker from hot area
- Have worker lie down
- Remove clothing
- COOL THE BODY (shower, cool wet cloths)
- Do Not give stimulants
- Get Medical Attention Immediately

Means should be available for prompt transport of an injured person to a physician or hospital, and there should be a telephone with emergency numbers conspicuously posted.

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Someone trained in basic first-aid should ALWAYS be on the project

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CARBON MONOXIDE
SAFETY & HEALTH CONSIDERATIONS

Carbon Monoxide Poisoning

When airline respiratory protection is used, it is important that the outside monitor be familiar with the system and any problems associated with breathing air. Carbon monoxide poisoning is the most important of these problems.

Carbon Monoxide (CO_2) is a colorless, odorless, tasteless gas

Sources:

- Oil lubricated compressors
- Internal combustion engine
- Open flame and fire
- Unvented gas
- Kerosene heaters

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CARBON MONOXIDE
SAFETY & HEALTH CONSIDERATIONS

Carbon Monoxide (CO_2) is a colorless, odorless, tasteless gas

Symptoms:

- Dizziness
- Nausea
- Headache
- Vomiting
- Drowsiness
- Vomiting
- Collapse
- Coma
- Death

(Note that these are very similar to heat stroke symptoms)

If these symptoms are observed, those persons should immediately be brought into fresh air and medical attention provided

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OTHER
SAFETY & HEALTH CONSIDERATIONS

MISCELLANEOUS

- OSHA requires that a poster "Job Safety and Health" be permanently posted on the job site notifying workers of their rights under the act.
- When an employer has more than 10 employees at any time he is required to maintain a record of injuries and illnesses that occur by using
  - Accident reports
  - OSHA Log 300 and 300A

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HAZARD COMMUNICATION STANDARD
29 CFR 1926.59

The purpose of this standard is to ensure that the hazards of chemicals or materials used in the workplace are identified and that the information, along with protective measures, is passed on to employers and employees.
Elements required are:

- Comprehensive written hazard communication program
- Labeling of hazardous materials
- Maintaining material safety data sheets (MSDS)
- Employee training

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Chapter 12

CLEANING UP THE WORK AREA

In this chapter we will review:

- Materials and equipment used for cleanup
- Basic procedures for conducting specific cleanup tasks
- Proper sequence of cleanup tasks
- Visual inspection
- Cleanup before, during and after gross removal

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CLEANING DURING GROSS REMOVAL

- Cleaning of the work area begins concurrently with gross removal
- A floor crew wearing proper PPE is responsible for bagging the material soon after it is removed, while it is still damp

Successful cleanup operations require proper sequencing of tasks and great attention to detail

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FINAL CLEANUP

Final cleanup applies to the phase of the project in which all visible ACM has been removed from the substrate, and is performed in the following sequence:

1. Remove gross contamination from wall covering or remove inner contaminated layer.
2. Remove gross contamination from equipment in work area.
3. Remove top layer of floor polyethylene.
4. Conduct visual inspection of all surface areas and re-clean if necessary.
5. Perform final wipe down of equipment/remove from work area.
6. Remove polyethylene floor covering/remove or clean carpet.
7. HEPA Vacuum
8. Wet wipe walls
9. Wet mop floors
10. Wait overnight, repeat wet wipe and wet mop procedures
11. Visual inspection/re-clean if necessary/re-inspect

- Page151 of the student manual provides a suggested sequence for clean up

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CLEARANCE MONITORING

- When air sampling results indicate the airborne fiber concentration meets the predetermined criteria for clearance, the final "critical" seals can be removed.
- If the first set of air samples fails clearance testing, the area must be re-cleaned, and air sampling must be performed again as many times as it takes until it passes clearance testing.

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FINAL CLEARANCE MONITORING

- Following passage of final air clearance testing, a final visual inspection should be performed by the building owner and the contractor (or their respective representatives).
  - Final visual inspection will look for any gross asbestos debris that may have been trapped behind critical barriers or underneath the decon unit.
  - Any debris that is discover must be cleaned appropriately.
  - After the area has been cleared for re-occupancy by unprotected personnel, remaining renovation cab begin (painting, carpet, etc)
- Clean up of the decontamination unit
- Clean up of the enclosed truck

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Chapter 13

WASTE DISPOSAL REQUIREMENTS

In this chapter we will review:

- Correct procedures regarding the disposal of ACM
- Procedures of notifying the appropriate agencies
- Appropriate labeling requirements, wet methods, and packaging procedures
- Requirements for effective transportation of asbestos waste and disposal at the landfill or disposal site
- Appropriate OSHA and EPA regulations regarding asbestos waste and disposal
- Requirements for record keeping

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PREPARATION OF ASBESTOS WASTE BEFORE TRANSPORTATION TO THE DISPOSAL SITE

Once the asbestos-containing waste material has been removed from the areas of concern, certain precautions must be taken before disposal operations begin.

- Wetting
- Containerizing
- Labeling

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WASTE LOAD-OUT PROCEDURE

The most effective method in a waste load-out procedure is to use two teams of workers; an Inside Team and an Outside Team.

- Inside Team
  - Responsible for ensuring that the waste material is properly packed before it is sent to the outside truck
- Outside Team
  - Will receive the waste materials into the load-out area from the inside team and load them into the enclosed truck

Waste Load-Out Area:

- Separate unit
- Usually a single chamber
- Adjoined to the work area with an airlock

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TRANSPORTATION TO THE DISPOSAL SITE

To prevent exceeding the available on-site storage capacity, sealed and labeled containers of asbestos waste should be removed and transported to the pre-arranged disposal location.

- Regulations may vary from state to state, but there are standard procedures that must be followed:
  - Disposal must occur at a NESHAP authorized site
  - Drivers must be properly trained in correct waste handling procedures

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AT THE DISPOSAL SITE

- Once the truck arrives at the disposal facility, the driver should approach the disposal location as closely as possible for unloading.
- Personnel off-loading the asbestos waste containers/bags should wear proper PPE clothing and respiratory protection.
- Waste bags should be inspected as they are off loaded. In the event a bag has been damaged, the material should be repacked into another bag as appropriate.
- Upon complete removal of all waste, the truck cargo area should be decontaminated using HEPA vacuums or wet wiping methods to comply with the EPA "no visible emission" criteria

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RECORDKEEPING

- It is very important to keep proper records of waste shipments in order to avoid potential future legal problems.
- Follow NESHAP regulations/requirements
- Complete the Waste Shipment Record properly

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OTHER CONSIDERATIONS FOR WASTE DISPOSAL

- Your asbestos waste disposal plan should also provide for filtering the run-off water from showers in the worker decontamination area.

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WASTE DISPOSAL ALTERNATIVES

Alternatives to traditional disposal of asbestos in landfills are currently being researched and developed in many universities and private companies, however nothing has been approved yet.

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EPA ASBESTOS COORDINATORS

Region I
Toxics Management JFK Federal Bldg , Boston, MA 02202
(617) 565-3836
Region II
2890 Woodbridge Ave., Building 5, MS-500, Edison, NJ 08837
(908) 321-6671
Region III
Air & Toxics Division, 841 Chestnut Building, Philadelphia, PA 19107
(215) 597-3160
Region IV
Asbestos Coordinator, 345 Courtyard Street, Atlanta, GA 30365
(404) 347-5014
Region V
Asbestos Coordinator, 77 W. Jackson Blvd., Chicago, IL 60604
(312) 353-5590
Region VI
Asbestos Coordinator,1445 Ross Avenue, Dallas, TX 75202
(214) 655-7244

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EPA ASBESTOS COORDINATORS

Region VII: Iowa, Kansas, Missouri, Nebraska
Asbestos Control Div., 11201 Renner Blvd, Lenexa, KS 66101
(913) 551-7003
Region VIII
999 18th Street - #500, 8 ART TS, Denver, CO 80202
(303) 293-1442
Region IX
Asbestos Coordinator, 75 Hawthorne Street, San Francisco, CA 94105
(415) 744-1128
Region X
Asbestos Coordinator, 1200 Sixth Avenue, Seattle, WA 98101
(206) 553-4762

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Chapter 14

SAMPLING AND ANALYTICAL METHODS PERTAINING TO ASBESTOS ABATEMENT

In this chapter we will review:

- Various methods for sampling asbestos as a bulk material, airborne fibers, or settled dust.
- Analytical methods used to analyze bulk material, air and settled dust samples.
- Common units for reporting airborne fiber concentrations.
- Sampling strategy used for monitoring asbestos abatement projects.
- Important aspects of final clearance air monitoring including inspection, aggressive monitoring, and clearance criteria.

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SAMPLING & ANALYTICAL METHODOLOGY

Sampling and analytical methods are important tools for assessing and monitoring asbestos materials.

- Sampling techniques are used to collect data from the work area/environment
- Analytical methods are used to determine what is in the sample.

Air Sampling: 2 basic methods

- Area
- Personal

Bulk Sampling

- The technique used to collect samples of suspect ACM such as fireproofing, insulation and acoustical spray

Settled Dust

- As an alternative to air sampling, settled dust may be collected to indicate fiber release from ACM
- Should not be used as the only source of air sampling

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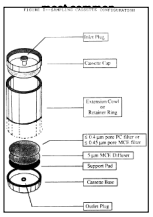
AIR SAMPLING EQUIPMENT

- Sampling pumps, 2 categories
  - high volume: typically used for area sampling
  - low volume: typically used for personal sampling
- Filters

  2 main types
  - Mixed cellulose ester (MCE) or membrane filters: and have widest use
  - Polycarbonate filters: should be used with caution
- Pump Calibration
  - EPA and OSHA require that sampling pumps be calibrated before and after each use
  - Calibrations must be recorded by the person conducting the sampling
  - Regular calibrations helps maintain the technical and legal validity of sampling data

Sampling Cassette



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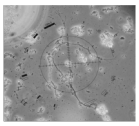
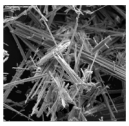
ANALYTICAL ALTERNATIVES

The primary analytical techniques are:

- Phase Contract Microscopy (PCM)
- Transmission Electron Microscopy (TEM)
- Scanning Electron Microscopy (SEM)
  - *some states do not authorize this type of analysis
- Fibrous Aerosol Monitor (FAM)
  - *some states do not authorize this type of analysis


PCM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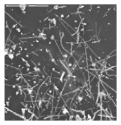
SEM


FAM

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AIR SAMPLING PROCESS

Air Sampling Before Abatement

- Prevalent Level Sampling
  - Conducted to estimate the existing airborne fiber concentrations inside and outside the building

Air Sampling During and After Abatement

- Personal Sampling
  - Conducted during the abatement project to determine employees' exposure (outside the respirator) to airborne fibers
  - Required by OSHA 29CFR1910.1001 and 1926.1101
  - Must be performed on at least 25% of the work force involved in the project

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AIR SAMPLING PROCESS

Area Air Sampling Inside the Work Area

- Collected to determine the concentrations of airborne asbestos fibers
- Taken from different areas within the removal area from one day to the next
- Collected using a portable, battery operated "personal" sampling pump

Area Air Sampling Outside the Work Area

- Collected from locations outside of the work area, but inside of the building to determine how well asbestos fibers are being contained in the worksite

Area Air Sampling Outside of the Building

- Area air samples are placed in locations outside the building during the abatement project to detect leakage of fibers from the worksite

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AIR SAMPLING PROCESS

Air Sampling After Final Cleanup of Work Area

- Conducted upon conclusion of an abatement project to estimate the airborne concentration of residual fibers
- Area must pass a thorough visual inspection for any remaining material before final clearance sampling is initiated.

Air Sampling In School Buildings

Refer to page 183 of your student manual for the final clearance air sampling, analytical sequence and clearance level requirements for asbestos abatement projects conducted in school buildings per AHERA regulations (40CFR part 763, subpart E)

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Chapter 15

POST REMOVAL LOCKDOWN AND ASBESTOS SUBSTITUTES

In this chapter we will review:

- The "lockdown" operation and how it fits into the final cleaning stages of a project
- Procedures used for applying lockdown materials to the substrate after removal of ACM has taken place
- Criteria used in selecting certain types of materials as effective lockdown agents
- Various factors that may influence asbestos replacement or re-insulation operations
- Awareness of some of the materials currently being used as asbestos-free substitutes and replacements
- Exactly where lockdown and asbestos replacement operations fit into the post abatement sequence of events

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LOCKDOWN METHODS

Lockdown is the procedure of applying a protective coating or sealant to a surface from which ACM has been removed.

Recommended sequence to follow:

1. Substrate should be completely of all visible debris before applying lockdown sealant
2. Collect ACM waste material and transport it out of the work area
3. Clean all visible debris by HEPA vacuuming and wet wiping
4. Conduct a visual inspection; reclean if necessary
5. Apply a heavy coat of lockdown sealant per manufacturers instructions
6. Collect inside layer of poly and transport out of work area as you would with ACM
7. Perform a second visual inspection to locate any asbestos materials that may have penetrated to the outside layer of poly.
8. Conduct pre-clearance monitoring
9. Conduct final clearance air monitoring

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LOCKDOWN PRODUCTS

A variety of products can be used for locking down the substrate.

- Typically applied as sprayed-on liquid type sealants
- Must be compatible with the substrate
- Obtain all available information on the substance (toxicity, volatility, fire ratings, etc)
- Recommended practice is to use color tinting when applying multiple coats of lockdown materials

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REPLACEMENT PRODUCTS / ASBESTOS SUBSTITUTES

Once the lockdown sealant has been applied and after final clearance monitoring has taken place, often the next step is to reapply an adequate substitute for the ACM that was originally present.

- Substitute material MUST be capable of the same functions and have similar properties relative to the original ACM

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Chapter 16
CONTRACT SPECIFICATIONS

In this chapter we will review:

- The importance of well-designed, detailed contract specifications
- Key elements of contract specifications
- Basic components of material, equipment and substitution specifications
- Importance of detailing specification for the execution of work
- Need for interdisciplinary approached to asbestos abatement

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CONTRACT SPECIFICATIONS

Well designed, detailed contract specifications provide the overall guidance for each asbestos abatement project.

- Permit the contractor to provide an accurate estimate or bid
- 2 contracts: one for the contractor, one for the air sampling professional
- Poorly designed specifications will result in a poorly performed project
- Most asbestos response actions must be designed by an accredited asbestos abatement project manager

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CONTRACT SPECIFICATIONS

Contract specifications are a written set of standards and procedures informing the contractors or abatement professionals of materials and operations necessary to successfully complete an abatement project.

Elements of the specifications include:

- Site inspection
- Scope of work
- Description of work
- Submittals and notices
- Site security
- Material
- Equipment

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CONTRACT SPECIFICATIONS

- Execution of work
- Respiratory protection
- Clearance air testing
- Waste disposal
- Material replacement
- Other abatement professionals

<u>Worker Protection</u>

Project specifications will detail the minimum protection which can be worn during each phase of the project

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Chapter 17

LEGAL AND INSURANCE ISSUES

In this chapter we will review:

- An overview of common and statutory law, including tort litigation and regulatory compliance
- The value of recordkeeping and documentation
- Asbestos abatement contract specifications and documents
- Understanding bonding, workers' compensation, and insurance requirements
- Avoiding legal pitfalls on asbestos abatement projects

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LEGAL PROBLEMS IN ASBESTOS ABATEMENT

A major area of concern for building owners is the legal implication of asbestos present in buildings.

Types of contracts

- American Institute of Architects (A.I.A) form contract
- Job manual/job specifications

Contract Specifications

- Should detail exactly what the building owner requires for the contractor and project monitor

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LEGAL PROBLEMS IN ASBESTOS ABATEMENT

Site Security

- Needs to be specifically addressed; who, when, where, how

Equipment

- Each owner should participate in decisions related to equipment for the abatement job; number of negative air pressure units, type of respiratory protection, type of clothing, etc.

Insurance

- Understand what the requirements are; who will be protected
- Length of coverage; "Claims made" or "occurrence" coverage
- Workers compensation
- Clean Air standard

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SUPERVISOR SKILLS

Asbestos Supervisors are, by definition, LEADERS IN THE ASBESTOS WORKPLACE.

•Must be able to:

- Plan and execute jobs
- Order materials
- Monitor tools/equipment
- Supervise and mentor all work
- Direct all technicians' work activities
- Work with crew
- Communicate clearly to all assigned to the job
- Train/mentor employees
- Report regularly to management
- Communicate with customers, agents, other contractors, etc
- Prepare asbestos reports

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SUPERVISION AND TRAINING

The heart of an asbestos abatement project is the care and skill exercised by the workers who remove the asbestos-containing materials.

- AHERA regulations stipulate that all abatement workers be accredited by completing at least a 4-day EPA approved training course
- OSHA also has minimum requirements for training based on the type of activity a person will perform
- Records of all training should be kept for each worker
- Many states also have licensing requirements of their own
  - Missouri
  - Iowa

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RECORDKEEPING

- Maintain permanent records on all phases of the job
- OSHA has specific requirements for how long certain records must be maintained
- Asbestos disease latency periods may extend 30 or more years beyond the work date. These records should be stored and maintained permanently

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ADEQUATE TIME FOR JOB PERFORMANCE

- Once the building owner has decided to conduct an abatement program, he is virtually always in a hurry
- To avoid contract disputes, the owner should specify enough time to realistically allow the project to be completed both in time and calendar placement for himself and the contractor

DISPOSAL OF WASTE

- The contract should provide information indicating the asbestos material must be properly containerized, labeled and shipped to an approved dump site
- Owner should obtain receipts showing delivery of materials
- Keep inventory of the drums to compare to the receipt

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USE OF IN-HOUSE PERSONNEL

- Use of in-house staff in lieu of outside experts may result in legal liability if the in-house staff is unqualified
- AHERA regulations require all maintenance and custodial personnel receive at least 2 hours of awareness training, with an additional 14 hours mandated for personnel whose work activity may disturb asbestos

SELECTION OF QUALIFIED CONTRACTORS

- Beware of the low bid, it may equate to an unqualified contractor
- Pre-qualify the contractor based on criteria such as experience, training, formal education, insurance, etc

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CLEANLINESS OF JOB SITE

- The building owner must be sure the contractor has thoroughly removed all material AND that the air is clean

AIR MONITORING PROFESSIONAL

- Integrity of the air monitoring person is vital
- Should be qualified and experienced

BONDING

- Primary considerations of the bonding company in determining whether to bond a contractor are the ability of the contractor to perform the work, and the contractor's financial ability

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Chapter 18

REGULATORY UPDATE

In this chapter we will review:

- General provisions of major federal asbestos-related regulations
  - DOT
  - EPA
  - OSHA
  - MSHA
- Major regulations pertaining to abatement projects and/or personnel

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INTRODUCTION

- Two federal agencies have been principally responsible for generating regulations fir asbestos control
  - OSHA
  - EPA
- Other federal agencies include
  - DOT: regulations regarding the transport of asbestos
  - NIST: (National Institute of Standards and Technology) establishes standards and protocols for laboratory accreditation
  - Consumer Product Safety Commission: bans asbestos in some products
- Other agencies with regulations for asbestos
  - NESHAP National Emission Standards for Hazardous Air Pollutants
  - AHERA Asbestos Hazard Emergency Response Act
  - ASHARA Asbestos School Hazard Abatement Reauthorization Act

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OSHA

U.S. Occupational Safety & Health Administration Asbestos Standards

- 3 sets of regulations that address asbestos exposure:
  - General Industry 29 CFR 1910.001
  - Construction Industry 29 CFR 1926.1101
  - Use of respirators (general) 29 CFR 1910.134
- OSHA coverage extends to all private-sector employers and employees in the 50 states, and all territories under federal jurisdiction
- OSHA is authorized to conduct workplace inspections
- Employees have the right to file an OSHA complaint without fear of punishment from the employer

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OSHA CONSTRUCTION INDUSTRY STANDARD

29 CFR 1926.011 contains construction industry standards:

- Exposure Levels
  - Permissible Exposure Limit (PEL) = 0.1 f/cc TWA
  - Excursion Limit (EL) = 1.0 f/cc
- Asbestos Work Classifications
  - Class I: activities involving the removal of TSI and/or surfacing ACM/PACM
  - Class II: activities involving the removal of ACM, which is not TSI or surfacing material
  - Class III: repair and maintenance operations where ACM, including TSI and surfacing materials, is likely to be disturbed
  - Class IV: maintenance and custodial activities during which employees contact but do not disturb ACM/PACM, and activities to clean up dust, waste and debris resulting from class I, II, or III activities

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OSHA CONSTRUCTION INDUSTRY STANDARD

29 CFR 1926.011 contains construction industry standards:

•Competent Person

- One who is capable of identifying existing asbestos hazards in the workplace, capable of selecting the appropriate control strategy, and having the authority to take prompt corrective measures. Personnel must be trained to meet the criteria of the EPA model Accreditation Plan for project designers or contractors/supervisors for Class I and II work, and training covering topics listed in the EPA's 16-hour O&M Training Program for Class III and IV work.

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OSHA CONSTRUCTION INDUSTRY STANDARD

29 CFR 1926.011 contains construction industry standards:

•Negative Exposure Assessment

- Demonstration by an employer that an employee's exposure during an operation is expected to be consistently below the PEL/EL level
- Presumed Asbestos-Containing Material (PACM)
- TSI and surfacing material found in buildings constructed no later than 1980
- Regulated Area
- Area established by an employer to demarcate where Class I, II, and III asbestos work is being conducted, and any adjoining area where debris and waste accumulate. Also includes any area where airborne asbestos levels are anticipated to exceed the PEL
- Proper warning signs must be displayed and must be posted at all approached to regulated areas

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OSHA CONSTRUCTION INDUSTRY STANDARD

29 CFR 1926.011 contains construction industry standards:

Regulated Area (cont'd)

- Multi-Employer Worksite
  - The employer performing work that requires the establishment of a regulated area must inform other employers of the nature of the work, the existence/requirements of the regulated area and measures to protect the other employer's personnel
- Methods of Compliance
  - To the extent feasible, engineering and work practice controls must be used to reduce employee exposure to below the PEL/EL

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OSHA CONSTRUCTION INDUSTRY STANDARD

29 CFR 1926.011 contains construction industry standards:

- Exposure Assessment and Monitoring
  - Initial Monitoring is performed to determine the airborne concentrations of asbestos to which employees may be exposed
  - Periodic Monitoring is performed daily within a regulated area

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CLASS I REQUIREMENTS

Class I Requirements

- All work must be supervised by a competent person
- Isolate the HVAC system
- Cover all non-moveable objects
- Use impermeable drop cloths beneath all removal activity
- Ventilate the regulated area to move dust away from the employee
- Use critical barriers or other isolation system in combination with perimeter air monitoring if;
  - The job involves >25 linear ft or >10 square ft of TSI
  - Where a negative exposure assessment has not been done, or
  - Where employees are working adjacent to Class I activity
- Control Methods:
  - Negative pressure enclosures
  - Glove bags
  - Negative pressure glove bags
  - Negative pressure glove box
  - Water spray process
  - Small, walk-in enclosures
  - Alternate control method certified by a CIH or PE who is a project designer

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CLASS II REQUIREMENTS

Class II Requirements

- Competent person supervision
- Indoor removals without a negative exposure assessment must:
  - Use critical barriers
  - Other feasible barrier/isolation methods
  - Listed work practices for each type of work
  - Employees must be trained and use work practices/controls specifically outlined in the standard based on the type of material involved

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CLASS III REQUIREMENTS

Class III Requirements

- Minimize exposure to individual performing work and bystanders
- Use local exhaust when feasible
- Use mini-enclosures or glovebag systems when cutting, drilling, abrading, sanding, chipping, breaking, or sawing TSI and/or surface material
- If exposures are above PEL/EL of a negative exposure assessment was not performed:
  - Contain area using drop cloths and plastic barriers, or
  - Isolate area using negative pressure enclosure, glovebag, etc

Use respirator if:

- Disturbing TSI or surfacing material
- PEL/EL exceeded
- A negative exposure assessment is not available

Note: Protective clothing and respirators are not required until the PEL levels are met **EXCEPT** K-12 school projects unless O&M

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CLASS IV REQUIREMENTS

Class IV Requirements

- Use of wet methods
- Use of HEPA vacuums
- Prompt action to clean up ACM/PACM debris
- Following paragraph H respirator requirements
- Assume waste and debris in areas with friable TSI and surfacing material contains asbestos

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ADDITIONAL REQUIREMENTS

- Respiratory Protection – Required:
  - During all Class I work
  - During all Class II work where ACM is not removed substantially intact
  - During all Class II and III work that is not performed wet
  - During all Class II and III work where TSI or surfacing ACM/PACM is disturbed
  - During all Class IV work within a regulated area where other employees are required to wear respirators
  - During all work where exposures exceed the PEL/EL
  - In emergencies

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ADDITIONAL REQUIREMENTS

- Protective Clothing – Required for any employee exposed to airborne concentrations of asbestos that exceed the PEL and/or EL, and:
  - In situations where a negative exposure assessment was required and not performed; and
  - For Class I work involving TSI or surfacing material in amounts exceeding 25 lin ft or 10 sq ft
- Additional protection may include:
  - Face shields
  - Vented goggles

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ADDITIONAL REQUIREMENTS

- Hygiene Facilities and Practices
  - Requirements differ based on the class of work activity involved
- Information and Training
  - Employer must provide training, at no cost to the employee, for all employees who install asbestos-containing materials, or who perform Class I, II, III, IV asbestos operations
- Housekeeping
  - Vacuums must have HEPA filters
  - Dust and debris in areas with accessible TSI, surfacing material or visibly deteriorated ACM must be HEPA vacuumed, not dry swept
  - Asbestos waste, scrap, debris, bags, containers, equipment and contaminated clothing consigned for disposal must be collected and disposed of in sealed, labeled, impermeable bags or other closed, labeled impermeable containers.

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ADDITIONAL REQUIREMENTS

- Medical Surveillance
  - Employer must establish a medical surveillance program prior to assignment
- Recordkeeping
  - Employer must keep an accurate record of all measurements taken to monitor employee exposure to asbestos

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EPA ASBESTOS REGULATIONS

U.S. Environmental Protection Agency Asbestos Standards

•EPA Worker Protection Rule:

- Extends the OSHA standards to state and local employees who perform asbestos work and who are not covered by OSHA Asbestos Standards or by a State OSHA plan
- NESHAP
- EPA's rules concerning the application, removal and disposal of ACM were issued under NESHAP
- Also includes rules concerning manufacturing, spraying and fabricating ACM
- Placed bans on ACM in 1973, 1976 and 1978
- Requires special notification to a regional or state NESHAP Coordinator before a building is demolished or renovated (requirements summary on pg 234)

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EPA ASBESTOS REGULATIONS

- AHERA
  - Signed into law October 1986, effective in December 1987
  - Includes provisions directing the EPA to establish rules and regulations addressing ACM in schools including that schools must use accredited persons to:
    - Conduct inspections
    - Develop management plans, and
    - Design or conduct response actions

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EPA ASBESTOS REGULATIONS

- Asbestos: Manufacture, Importation, Processing and Distribution in Commerce Prohibitions ; Final Rule (Ban and Phase Out Rule)
  - July 7, 1989 EPA announced its ban and phase out rule
  - Would have banned the use of nearly 95% of asbestos products used in the U.S.
  - Regulation was vacated , and appeal from the EPA was rejected in November 1991, leaving only 6 asbestos-containing products that are still subject to the Ban and Phase-Out Rule:
    - Corrugated paper
    - Rollboard
    - Commercial paper
    - Specialty paper
    - Flooring felt, and
    - New uses of asbestos

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STATE AND LOCAL REGULATIONS

- Provisions in AHERA and ASHARA encourage states to develop their own regulatory programs as long as the programs are at least as stringent as AHERA's Model Plan
  - Missouri has their own program
  - Iowa does not have its own program
- Additionally, some states have established requirements that exceed the EPA's in the areas of abatement notification and actions, work practices and transportation and disposal of ACM
- Regulations for Missouri and Iowa are included with your class materials

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