



Asbestos & Lead Awareness

Student Materials
MTI Level One Construction Course
Consultation Education & Training Division
Michigan Occupational Safety & Health Administration
Michigan Department of Licensing and Regulatory Affairs
www.michigan.gov/miosha
(517) 284-7720

Asbestos and Lead Awareness



MIOSHA Training Institute (MTI)
Level One Elective Course

Presented By:
Consultation Education & Training (CET) Division
Michigan Occupational Safety & Health Administration
Michigan Department of Licensing and Regulatory Affairs
www.michigan.gov/miosha
www.michigan.gov/asbestos
(517) 284-7720



Objectives

- Understand the duties of MIOSHA's Asbestos Program.
- Identify three types of asbestos and products potentially containing asbestos.
- Identify exposure routes for asbestos.
- Identify the health effects of asbestos exposure.
- Identify signs and symptoms of asbestos-related illnesses.
- Locate and recognize asbestos containing material (ACM) or presumed asbestos containing material (PACM) in various conditions (damaged, deteriorated, delaminated, etc.).
- Identify State and Federal requirements for asbestos.

Required Supplemental Training

Employers must supplement this training with site specific training which must include:

- The presence, location and quantity of ACM at the site and
- Precautions taken to ensure airborne asbestos is confined to the area

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Who Is Exposed?

- YOU ARE!
- Airborne (friable) asbestos is a health threat to all people.
- Contractors – 1.3 million employees in construction-related fields, plumber, electrician, heating and ventilation worker, carpenter, builder, maintenance worker, janitor, etc.



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MIOSHA Asbestos Program

- Licenses asbestos abatement contractors
- Processes abatement project notifications
- Accredits individuals in the asbestos profession
- Approves asbestos training courses
- Reviews AHERA Management Plans
- Investigates asbestos-related compliance issues
- Database of all the above at www.michigan.gov/asbestos

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Licensing of Asbestos Abatement Contractors

- Abatement contractors must be licensed by the Asbestos Program before engaging in any friable asbestos abatement work.
- Exception – exempt trade group members:
 - ◆ Electricians
 - ◆ Mechanical contractors
 - ◆ Plumbers
 - ◆ Residential builders

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Project Notifications

Must notify the Asbestos Program of any friable asbestos removal or encapsulation projects equal to or greater than 10 linear feet and/or 15 square feet.

- Abatement contractors
- Exempt trade groups

Accreditation of Workers

- Types of workers:
 - ◆ Abatement Workers
 - ◆ Abatement Contractor/Supervisors
 - ◆ Abatement Project Designers
 - ◆ Inspectors
 - ◆ Management Planners
- Must become accredited before working in Michigan.

Approval of Training Courses

- Approved training courses:
 - ◆ EPA or Michigan Asbestos Abatement Worker
 - ◆ Abatement Contractor/Supervisor
 - ◆ Abatement Project Designer
 - ◆ Inspector
 - ◆ Management Planner
- Courses must submit course materials to the Asbestos Program and receive approval before the course may be taught in Michigan.

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AHERA Management Plan Review

- Reviewing kindergarten-12th grade private and public non-profit school asbestos management plans.
- Assure the plan meets minimum requirements under the Asbestos Hazard Emergency Response Act (AHERA).

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Compliance Investigations

- Investigates abatement activities of contractors.
- Responds to formal complaints of improper work practices or procedures.
- Citations may be proposed with fines imposed for as much as \$5,000 for each violation per day that a violation occurs.

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The Big Picture

- Airborne (friable) asbestos is a health threat to all people.
- Regulations that once focused on schools now impact most buildings and/or contractors.
- Regulations govern who and what is allowed for inspections and remediation.



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I.

Asbestos: Its Various Forms & Uses



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What Is Asbestos?

- A group of minerals (chrysotile, amosite, crocidolite, actinolite, tremolite, and anthophyllite)
- Known and used for thousands of years
- Mined from the Earth
- Asbestos has the ability to separate into thin strong fibers
- Resistant to heat, corrosion, and chemicals
- Used in over 3,500 products
- Confirmed human carcinogen

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Commonly Used Terms

- ACM: Asbestos containing material.
- Accredited: A person licensed by the state.
- Class I, II, III, and IV: MIOSHA designations for class/category of asbestos related work used to determine proper work procedures and training requirements.
- Disturbance: Activities that disrupt the matrix of ACM or PACM, crumble or pulverize ACM or PACM, or generate visible debris from ACM or PACM.

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Commonly Used Terms

- Encapsulation: The sealing of friable asbestos materials by means of the spraying of liquid sealant or any other suitable sealing method.
- Fiber: A particulate of ACM, 5 micrometers long and length to diameter ratio of 3 to 1.
- Friable: ACM when dry, can be crumbled, pulverized or reduced to powder by hand pressure.
- Latency period: Time between first exposure and appearance of disease.

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Commonly Used Terms

- PACM: Presumed asbestos-containing material.
- Removal: All operations where ACM and/or PACM is taken out or stripped from structures or substrates - includes demolition operations.
- Renovation: The modifying of any existing structure, or portion thereof.
- Repair: Overhauling, rebuilding, reconstructing, or reconditioning of structures or substrates, including encapsulation or other repair of ACM or PACM attached to structures or substrates.

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II.

HEALTH EFFECTS ASSOCIATED WITH ASBESTOS EXPOSURE



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Asbestos Exposure Routes

- Only enters the body by inhalation of fibers
- Dangerous levels are not detected by body's senses:
 - ◆ Fibers are invisible
 - ◆ No odor
 - ◆ No taste
 - ◆ No irritation

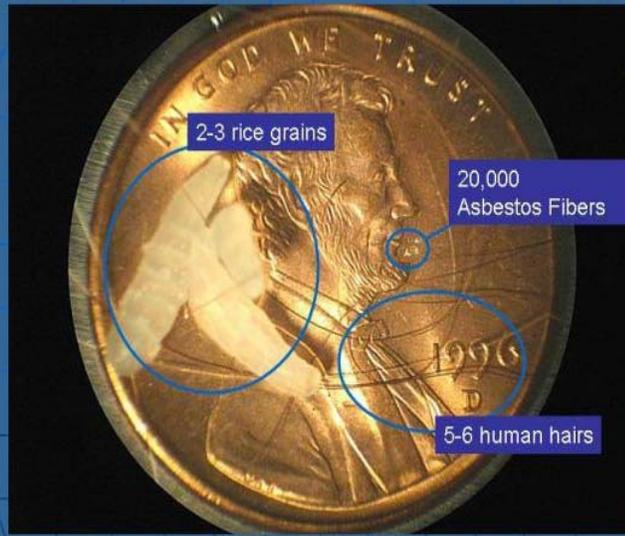


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**Asbestos is a Proven Human Carcinogen and
There is No Safe Level of Exposure.**



How small is asbestos?



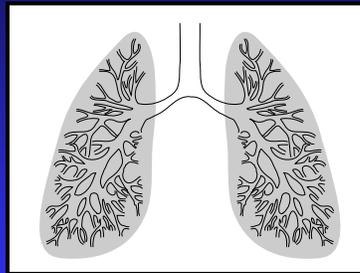
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Is Asbestos Harmful?

Diseases:

- Asbestosis
- Cancers:
 - ◆ Lung Cancer
 - ◆ Mesothelioma
 - ◆ Laryngeal Cancer



Health Effects of Asbestos

- Exposure does not result in immediate symptoms.
- No known level of exposure is considered safe.
- Latency period is between 15 to 40 years.
- Some individuals who work with material have a “it can’t happen to me” attitude.
- Once a person develops symptoms it is usually too late.

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Asbestosis

A fibrotic scarring of the lungs, the symptoms are:

- Shortness of breath
- Coughing
- Diffuse basal rales
- Reduced pulmonary function
- Radiographic changes
- Clubbing of fingers
- Cyanosis

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Show Asbestosis Video



www.medical-definitions.net/Asbestosis.htm

Lung Cancer

- Uncontrollable cellular growth of lung tissue.
- Synergistic effect with those who smoke.



Up to 90 times greater likelihood of being diagnosed with lung cancer for those who smoke and are exposed to asbestos fibers!



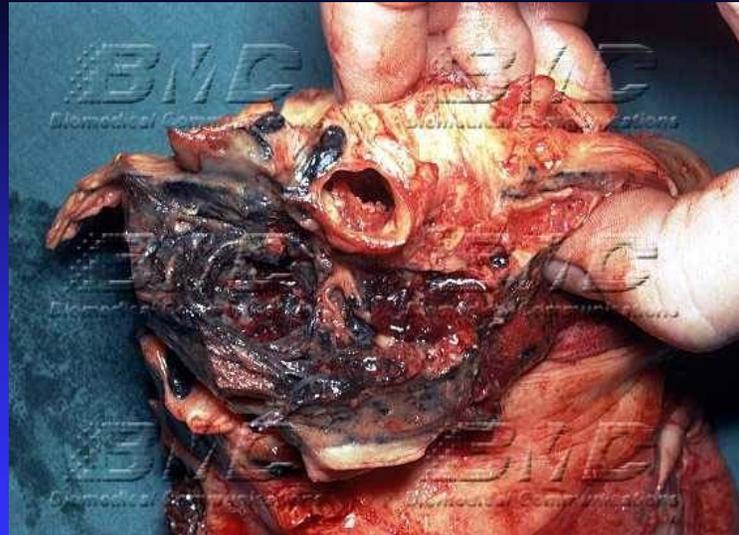
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Lung Cancer

Symptoms:

- Fluid in between the lungs and the rib cage
- Cough
- Chest pain
- Progressive weight loss
- Reduced pulmonary function
- Radiographic changes
- Clubbing of fingers

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www.hsc.mb.ca/bmc/PhotoSales/Cancerous_lung

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Mesothelioma

- Causes tumors to arise from the thin membranes that surround internal organs.
- Rare in general population.
- Difficult to diagnose...underestimated numbers.
- All asbestos types can cause Mesothelioma.
- Diagnosis of Steve McQueen the actor.

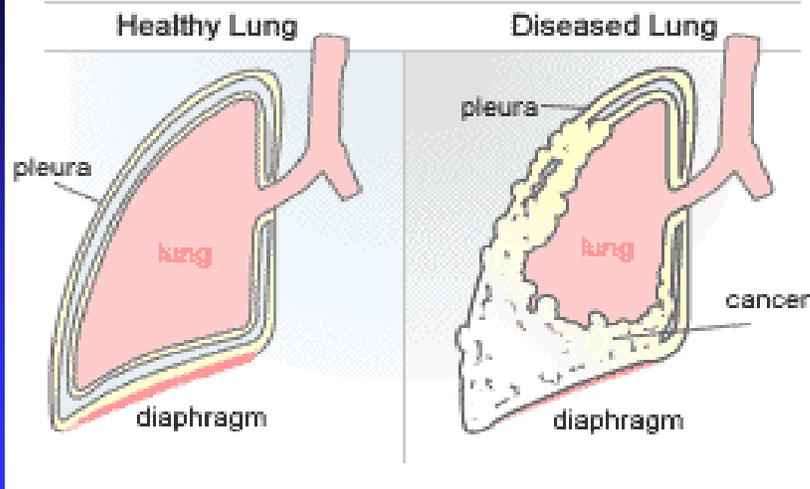
30

Mesothelioma

- Cancer of the chest and abdominal cavities.
- Direct link to asbestos.
- Rarest disease.
- Latency period of 40 years, versus 15 to 20 years.
- Always fatal.

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Pleural Mesothelioma



<http://www.mesothelioma-online-advice.com>

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Mesothelioma

Symptoms:

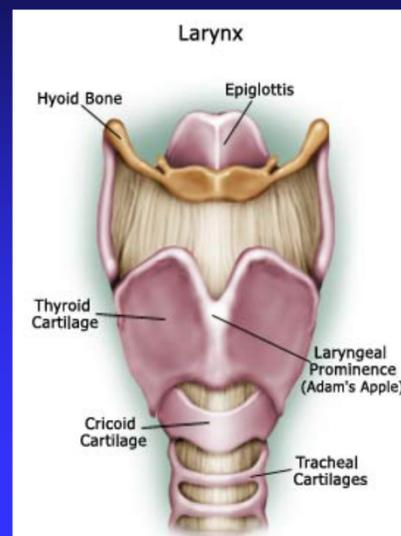
- Pleural effusion (fluid in pleural cavity)
- Breathlessness
- Chest Pain
- Abdominal swelling
- Progressive weight loss
- Reduced pulmonary function
- Radiographic changes

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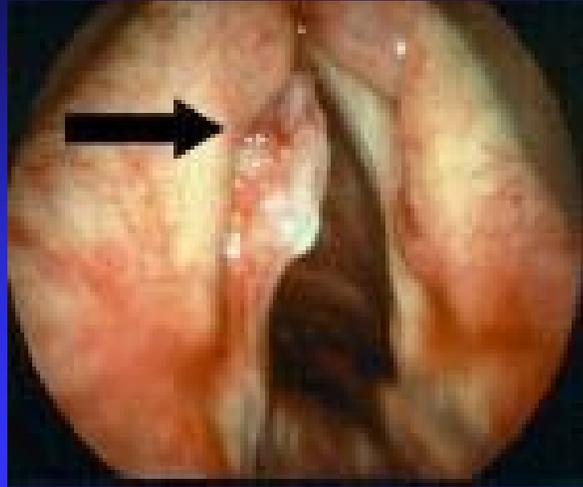
Laryngeal Cancer



Larynx



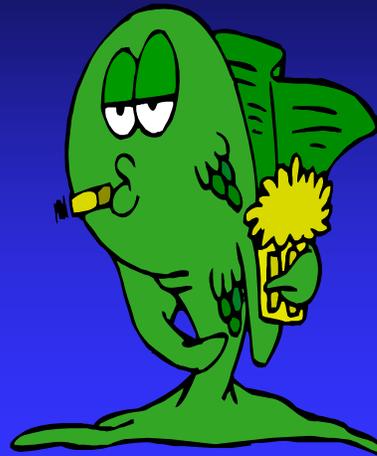
Laryngeal Cancer



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Causes of Laryngeal Cancer

- Smoking
- Alcohol consumption
- Fibers - asbestos particles inhaled and become lodged in the mouth, throat, and lungs



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Preventative Measures

- Smoking and working with asbestos – QUIT smoking!
- Heavy alcohol drinker and work with asbestos – STOP excessive drinking!
- Follow appropriate work practices and use respiratory protection.



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III.

Recognition and Locations of Suspect Asbestos Containing Building Materials



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Applications of Asbestos

Divided into three categories of asbestos containing materials:

- Thermal system insulation
- Surfacing
- Miscellaneous

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Thermal System Insulation

Boilers



Turbines



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Thermal System Insulation

Tanks



Piping



41

Thermal System Insulation

Ducts



Valves/Unions



42

Thermal System Insulation

Ovens



Kilns



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Surfacing Materials

- Sprayed or troweled on surfaces:
 - ◆ Walls
 - ◆ Ceilings
 - ◆ Structural members
- Acoustical, decorative, and fireproofing

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Surfacing Materials



Surfacing Materials



Spray-on
Insulation



Surfacing Materials

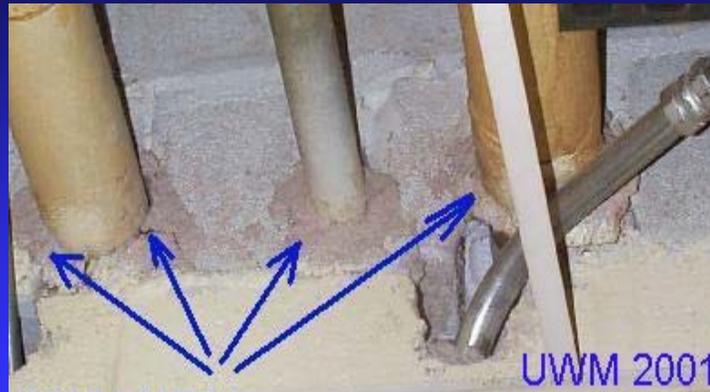
Wall Plaster



JUL 7 2006



Surfacing Materials



Fire Stops

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Surfacing Materials



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Miscellaneous Materials

Includes mostly non-friable materials:

- Floor tile
- Ceiling tile (lay-in type only)
- Roofing felts
- Concrete pipe
- Outdoor siding
- Fabrics

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Miscellaneous Materials

Roofing Materials (Transite and Asphaltic)



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Miscellaneous Materials

Flooring Materials



53

Miscellaneous Materials

Siding Materials (Transite)



54

Miscellaneous Materials

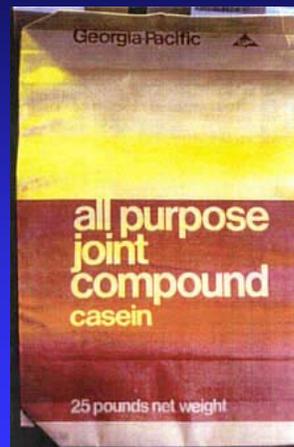
Ceiling Tiles



55

Other Miscellaneous Materials

- Joint compound
- Asbestos gaskets
- Pipeline coating
- Asbestos cloth
- Cement water pipes
- Galbestos
- Everything else



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Other Miscellaneous Materials

Gasket Material



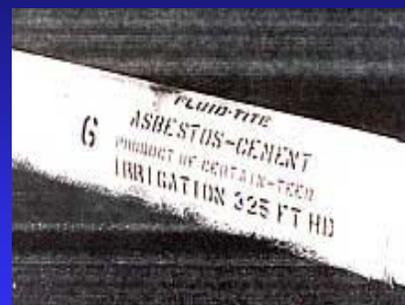
57

Other Miscellaneous Materials

Asbestos Cloth



Transite Water Pipe



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Commonly Used Asbestos Containing Materials In Buildings

- Cement Pipes Water/Heat
- Cement Wallboard or Panels
- Cement Siding or Roofing
- Cement Corrugated Roof Panel
- Asphalt Floor Tile
- Vinyl Floor Tile
- Vinyl Sheet Flooring
- Flooring Backing
- Mastics/Adhesives/Glues
- Acoustical Plaster
- Decorative Plaster
- Textured Paints/Coatings
- Elevator Brake Shoes
- Elevator Equipment Panels
- Ceiling Tiles /Lay-in Panels
- Thermal Paper Products
- Blown-in Insulation
- Spray-Applied Insulation
- Spray Applied Fireproofing
- Fire Doors
- Fire Curtains
- Fire Blankets
- High Temperature Gaskets
- Laboratory Hoods/Table Tops
- Laboratory Gloves
- Taping Compounds (thermal)
- Packing Materials (for wall/floor penetrations)

(This list does not include every product or material that may contain asbestos. It is intended as a general guide to show common building materials that contain asbestos.)

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Commonly Used Asbestos Containing Materials In Buildings

- HVAC Duct Insulation
- Boiler Insulation
- Breaching Insulation
- Ductwork Flexible Fabric
- Cooling Towers
- Pipe Insulation
- Electrical Busboards
- Switches
- Electrical Panel Partitions
- Electrical Cloth
- Electric Wiring Insulation
- Chalkboards
- Roofing Shingles
- Roofing Felt
- Base Flashing
- Sink Undercoating
- Glazing/Caulking/Putties
- Wallboard
- Joint/Spackling Compounds
- Vinyl Wall Coverings
- Galbestos
- Cove Base

(This list does not include every product or material that may contain asbestos. It is intended as a general guide to show common building materials that contain asbestos.)

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IV.

Recognition of Damaged, Deteriorated, and Delaminated Asbestos Containing Building Material

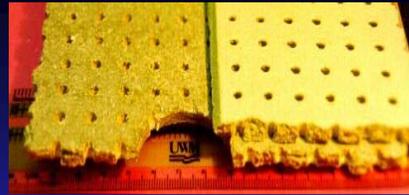


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Damaged Material

- The surface has crumbled, blistered, is water-stained, gouged, marred, or otherwise abraded.
- Accumulation of powder, dust or debris similar in appearance to the suspect material on surfaces beneath the material.

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Damaged Ceiling Tiles

www.uwm.edu/Dept/EHSRM/ASB/acmimages3.html



Damaged
Thermal System
Insulation (TSI)

www.do-diligent.com/gallery/plumbing-fixtures.html

63

Potential Damage

The chances of future disturbance is dependent on the location of the material with respect to:

- Building occupants (frequency of potential contact)
- Sources of vibration
- Sources of air erosion

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Asbestos Quiz

Are the following statements “true” or “false”?

- Asbestos is a group of minerals that includes acetone, concrete, and silica.
- Asbestos smells and tastes funny.
- Asbestos causes the following diseases: Asbestosis, Laryngeal Cancer, Lung Cancer, Mesothelioma.

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Asbestos Quiz Answers

- Asbestos is a group of minerals that includes acetone, concrete, and silica.
 - ◆ False: amosite, chrysotile, and crocidolite are the main forms.
- Asbestos smells and tastes funny.
 - ◆ False: asbestos has no warning properties – the fibers cannot be seen or smelled and have no taste.
- Asbestos causes the following diseases: Asbestosis, Laryngeal Cancer, Lung Cancer, Mesothelioma.
 - ◆ True.

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Facility Management, Surveys, and Inspections



67

Operations & Maintenance – Responsible Parties

- Building or facility owner
- Designated person
- School principal
- Engineer
- Director of Maintenance

68

When must a survey be performed?

- NESHAP: ...prior to the commencement of the demolition or renovation
- AHERA: ...shall be inspected prior to its use as a school building
- MIOSHA/OSHA:
 - ◆ Construction Standard – ...before work is begun in buildings built previous to 1981
 - ◆ General Industry Standard – ... in buildings built previous to 1981

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Building Inspections



- Buildings constructed no later than 1980.
- Inspectors:
 - ◆ MIOSHA accredited or
 - ◆ Certified Industrial Hygienists
- Covers the entire facility.
- Must include presence, location, and quantity of suspect ACM.
- Buildings with ACM must have trained custodians and/or janitors.

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Incomplete surveys

- OSHA: 29 CFR 1926.1101(k)(2)...shall determine the presence, location, and quantity of ACM, and/or PACM...
- A survey lacking the presence, location, or quantity of ACM is considered an incomplete survey.

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On-site Inspections

- What we look for
- What we see
- What we'd like to see
- Additional issues



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What We Look For...

- Initial contact
- Asbestos building survey
- Recent project activity
- Assess building systems
HVAC, plumbing,
walls/ceilings
- Enclosure: decontamination
unit and inside containment
- Employees to Interview
- Air sampling



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Work Practices

- Trained worker
- Regulated area
- Personal Protective
Equipment (PPE)
- Wet methods
- Air monitoring



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www.environmentaladvantage.com/asbabt.htm

75



76



www.cwenvironmental.com/abatement.htm

77



www.asbestosguru-oberta.com/bio.htm

78



79



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Disposable full body coveralls complete with elastized hoods made of spun polyefin material "Tyvek" by Dupont or nonwoven material

What we see



Poor Cleanup After Abatement



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Poor Handling of ACM Waste



84

Equipment Storage Areas



www.abastra.co.uk/quote.html

www.epsilon solicitors.co.uk/asbestos_illnesses.html

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Encapsulation of ACM



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ENCAPSULATION: is a successful option in dealing with asbestos and involves covering the asbestos with a sealant.

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Poor Handling of ACM Waste Materials

- Unlabeled truck used to haul significantly damaged transite siding material.
- Note, the Gatorade and pop bottles within.

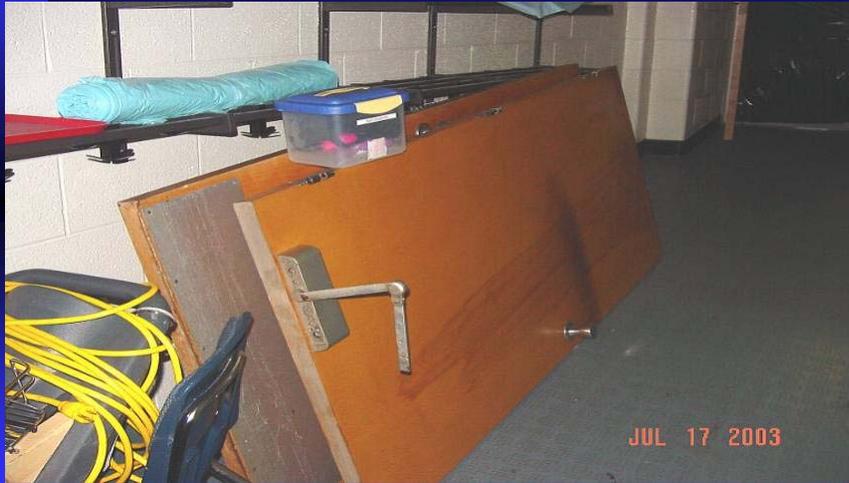


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Ceiling Tile Removal Project



Fire Door Removal



89

ACM – Roofing Material Removal



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What we see



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Layered TSI Material Example



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Transite Siding Removal



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Transite Siding Removal – cont.



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TSI Removal in a Home

Class I friable TSI removed dry without adequate containment exposing the home owner and family.



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VI.

State and Federal Regulations



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Michigan Asbestos Regulations

- Public Act 135 of 1986, as amended
- Public Act 440 of 1988, as amended
- Public Act 92 of 1993
- Part 1



98

Michigan Public Act 135 of 1986

- Regulates licensing of asbestos abatement contractors and their activities and requires them to:
 - ◆ Employ trained and accredited workers.
 - ◆ Carry Michigan workers' compensation insurance.
 - ◆ Notify of projects > 10 linear ft. and/or 15 sq. ft.
 - ◆ Pay 1% project fee.
- Established powers and duties of the Department of Licensing and Regulatory Affairs (LARA).
- Created the Asbestos Abatement Fund.

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Michigan Public Act 135 of 1986

- The following trade groups are exempt from licensing requirements:
 - ◆ Electrical contractors.
 - ◆ HVAC contractors.
 - ◆ Plumbing contractors.
 - ◆ Residential builders & maintenance/alteration contractors.
- Exempt ONLY from licensing requirements:
 - ◆ Only if work is incidental to their trade AND less than 260 linear feet and/or 160 square feet.

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Michigan Public Act 440 of 1988

The Asbestos Workers Accreditation Act provides for:

- Accreditation of persons who perform asbestos-related work in schools and public and commercial buildings.
- Approval of asbestos training courses.

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Michigan Public Act 440 of 1988

Accreditation is required for:

- Abatement Workers
- Contractor/Supervisors (Competent Person)
- Project Designers
- Building Inspectors
- Management Planners (K-12 schools only)

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Public Act 92 of 1993

The “Seller Disclosure Act.”

Took effect in January of 1994. It requires sellers of residential real estate to disclose information on various property conditions, including the presence of health and environmental hazards such as asbestos, lead paint and radon.



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Part 1. General Rules

This rule requires employers to instruct each employee in the recognition and avoidance of unsafe conditions, and the regulations applicable to his work environment to control or eliminate any hazards or other exposure to illness or injury. Asbestos would be one such hazard.

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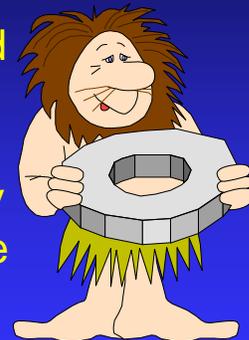
Asbestos Regulations

- MIOSHA Part 602. (OSHA: 29 CFR 1926.1101).
- MIOSHA Part 305. (OSHA: 29 CFR 1910.1001).
- EPA: 40 CFR PART 763 (AHERA).
- EPA: 40 CFR PART 763 (MAP).
- EPA: 40 CFR PART 61 (NESHAP).

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Asbestos Standards for Construction OSHA 29 CFR 1926.1101

Previously identified as 29 CFR 1926.58, it was amended on August 10, 1994. Along with subsequent revisions, it became effective in its entirety on October 1, 1995. The state of Michigan has adopted the revisions.



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Asbestos Exposure Limits

TWA

0.1 fibers/cm³, 8-hr TWA

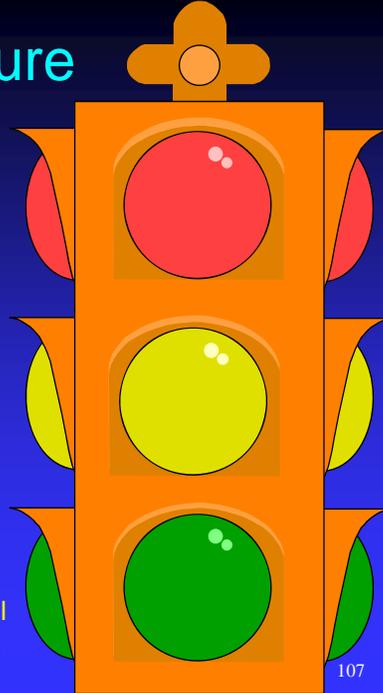
Excursion Limit

1 fibers/cm³, 30-minute TWA

Acceptable Exposures*

< 0.1 fibers/cm³, 8-hr TWA, or
< 1 fibers/cm³, 30-minute TWA

Even with acceptable exposures, must still comply with provisions of the standard.



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Asbestos Standards for Construction Basic Requirements

- Categorizes work into four classes.
- Requires regulated areas.
- Requires a "Competent Person" on-site.
- Requires employee exposure monitoring/assessments.
- Requires medical surveillance.
- Requires respiratory and clothing protection.
- Mandates training.
- Establishes work practices and engineering controls.

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Asbestos Standards for Construction Classes of Work

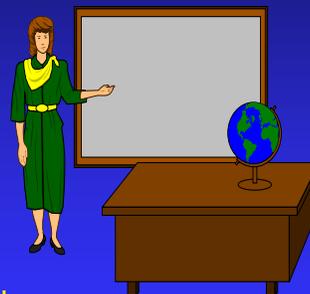
Four (4) classes of asbestos-related work:

- Class I - Removal of thermal system insulation and surfacing materials.
- Class II - Removal of all other ACM (generally intact and non-friable).
- Class III - Repair and maintenance operations where ACM may be disturbed.
- Class IV - Maintenance and custodial work where ACM is contacted but not disturbed.

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Asbestos Standards for Construction Training Requirements

- Class I: 32 hour Worker and 40 hour Contractor/Supervisor courses
- Class II: Same as Class I
 - ◆ Except when removing one generic material
 - ◆ Then only 8 hours
 - ◆ Flooring and roofing agreements
- Class III: 16 hour O & M course
- Class IV: 2 hour asbestos awareness course
- Annual refresher training required



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Asbestos Standards for Construction Multi-Employer Worksites

Requires the following:

- Informing other employers of ACM work.
- ACM hazards to be abated by the contractor who created or controls the source of ACM.
- Employees shall be protected from exposure.
- Employers shall prevent ACM fiber migration.
- General contractor has supervisory authority.

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Asbestos Standards for Construction Building Inspections

- Requires building inspections for ACM.
- Requires building owners to notify all employers who will work within or adjacent to ACM of the presence, location and quantity of said ACM.
- Employers who discover ACM or PACM shall notify the owner and other employers within 24 hours.

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Asbestos for General Industry

OSHA 29 CFR 1910.1001

- The General Industry Standard applies to occupational exposure to ACM in all industries covered by OSHA except:
 - ◆ Construction work AND
 - ◆ Shipbuilding and repairing.
- Similar to the construction standard.
- Requires a building survey for asbestos and training for custodial employees performing housekeeping in areas with ACM or PACM.
- But, does not define work categories for abatement in the class system.

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Asbestos Hazard Emergency Response Act (AHERA)

EPA 40 CFR PART 763

- Regulates the following in K - 12 grade public and private schools.
 - ◆ Asbestos-containing building material (ACBM) inspections,
 - ◆ Management practices, and
 - ◆ Response actions.
- Requires initial inspection with follow-up inspections every 3 years.
- Must have a management plan for all ACBM response actions.

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Model Accreditation Plan (MAP) EPA 40 CFR PART 763

- Establishes the framework for the accreditation of individuals and approval of training courses.
- Michigan Public Act 440 of 1988, as amended, is Michigan's equivalent.

115

National Emission Standard for Hazardous Air Pollutants (NESHAP) EPA 40 CFR PART 61

- Regulates the demolition and renovation of buildings that contain ACM.
- Requires:
 - ◆ Prior notification to MLARA (MIOSHA), MDEQ.
 - ◆ Proper training of workers.
 - ◆ Usage of wet methods.
 - ◆ Proper disposal methods.

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How To Protect Yourself?

- Evacuate area if inadvertent asbestos disturbance activity occurs.
- Alert your supervisors
- Get proper training.
- Avoid disturbing materials.

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Final Steps to Complete Training

Employers must provide employees with supplemental site specific training which must include:

- The presence, location and quantity of ACM at the site and
- Precautions taken to ensure airborne asbestos is confined to the area

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Asbestos Quiz

Are the following statements “true” or “false”?:

- Asbestos poses its greatest health hazard when it is exposed in a friable state.
- The use of asbestos is illegal in the U.S.
- Only those who work with asbestos are susceptible to health problems.
- Wearing a dust mask will protect you.

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Asbestos Quiz Answers

- Asbestos poses its greatest health hazard when it is exposed in a friable state.
 - ◆ True – when in an exposed friable state, asbestos fibers can easily become airborne.
- The use of asbestos is illegal in the U.S.
 - ◆ False – the EPA ban on asbestos was overturned. Most companies have found alternatives due to liability issues.
- Only those who work with asbestos are susceptible to health problems.
 - ◆ False – family members have died of asbestos-related diseases.
- Wearing a dust mask will protect you.
 - ◆ False – only a respirator with P100 (HEPA) filters is approved.

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More Information

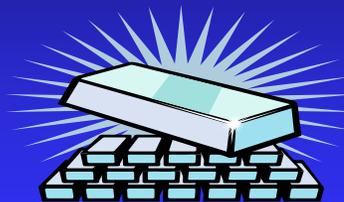


- Asbestos Program 517-284-7685
- CSHD General Info Line 517-284-7680
- GISHD General Info Line 517-284-7750
- DEQ Waste Mgmt. 517-373-2730
- DEQ Air Quality 517-335-4639
- EPA Region V 312-353-9062
- Federal OSHA 202-219-7711

www.michigan.gov/asbestos

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Part 603. Lead Exposure In Construction



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Objectives

- Understand lead exposure in construction and general industry
- Learn the health effects of lead and how it enters the body
- Understand exposure determination and interim protective measures
- Understand respiratory protection
- Learn about protective clothing
- Identify housekeeping and hygiene facility issues
- Recognize medical surveillance concerns
- Identify lead training related issues

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Scope of Part 603

- Demolition or salvage;
- Removal or encapsulation;
- New construction, alteration, repair, or renovation;
- Installation of products;
- Lead contamination/emergency cleanup;
- Transportation, disposal, storage, or containment; and
- Maintenance operations.

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Potential Lead Exposure Sites



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Scope of Part 310

- Applies to all occupational exposures to lead in industry except Construction and Agriculture
- Metallic lead, Inorganic lead compounds, Organic lead soaps

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Definition

- “Lead” means:

Metallic lead, all inorganic lead components, and organic lead soaps. Excluded from this definition are all other organic lead components.

- “Action Level” means:

Employee exposure, without regard to the use of respirators, to an airborne concentration of 30 micrograms of lead per cubic meter of air (30 $\mu\text{g}/\text{m}^3$ or 0.030 mg/m^3) calculated as an 8-hour time-weighted average (8-hr TWA).

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Definition

- “Competent person” means:

Someone who is capable of identifying existing and predictable lead hazards in the surroundings or working conditions and who has authorization to take prompt corrective measures to eliminate them.

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Exposure Limits

- Action Level (AL):
 - ◆ 30 $\mu\text{g}/\text{m}^3$ or 0.030 mg/m^3 , 8-hr TWA
- Permissible Exposure Limit (PEL):
 - ◆ 50 $\mu\text{g}/\text{m}^3$ or 0.050 mg/m^3 , 8-hr TWA
- Extended work shifts:
 - ◆ Adjust PEL for extended work shifts
 - ◆ If exposed > 8 hours per day:
 - ◆ $\text{PEL} = 400 \div \text{hours worked}$
 - ◆ For a 10-hour workday: $\text{PEL} = 40 \mu\text{g}/\text{m}^3$, 10-hr TWA

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Exposure and Health Hazards

- Routes of exposure:
 - ◆ Inhalation
 - ◆ Ingestion
- Health effects:
 - ◆ Cumulative blood and neurological effects
 - ◆ Reproductive hazards
 - ◆ Group 2B – possibly carcinogenic to humans
 - ◆ Symptoms can include weakness, insomnia, eye irritation, facial paleness, anorexia, low-weight, colic, malnutrition, anemia, tremors & paralysis of the wrists and ankles
- **91% of lead exposure in adults is occupational!**

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Initial Determination

The employer shall initially determine if any employee may be exposed to lead at or above the action level, regardless of respirator use.



Negative Initial Determination

- Employees exposed to airborne concentrations of lead below the action level.
- Maintain a written record that includes:
 - ◆ The date of determination,
 - ◆ Job descriptions and location within the worksite, and
 - ◆ Name and social security number of each employee monitored.

Positive Initial Determination

- Possibility of an exposure at or above the action level:
 - ◆ Additional monitoring is required
 - ◆ If > Action Level but < PEL:
 - ◆ Every 6 months
 - ◆ Until 2 consecutive samplings are < Action Level
 - ◆ If > PEL:
 - ◆ Quarterly
 - ◆ Until 2 consecutive samplings are < Action Level or PEL
- Measurements made the preceding 12 months may be used to satisfy the monitoring requirements

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Exposure Monitoring

- Additional monitoring is required when:
 - ◆ Change in process or production,
 - ◆ Change in control equipment,
 - ◆ Change in personnel, and/or
 - ◆ Change in work practice.
- Notify employees of the results in writing within 5 working days of receipt.

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Interim Controls

- Required during the initial determination process – paragraph (d)(2)(v)
- Interim employee protections include:
 - ◆ Appropriate respiratory protection – paragraph (f)
 - ◆ Appropriate personal protective clothing – paragraph (g)
 - ◆ Change areas – paragraph (i)(2)
 - ◆ Hand washing facilities – paragraph (i)(5)
 - ◆ Biological monitoring – paragraph (j)(1)(i)
 - ◆ Training – paragraph (l)(1)(i)

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Protection of Employees During/Prior Assessment of Exposure – (d)(2)

- If:
 - ◆ Lead coatings or paint are present AND
 - ◆ No initial assessment completed/available documenting exposures less than the PEL, THEN
- Treat employee as if exposed above the PEL AND
- Implement interim employee protective measures – paragraph (d)(2)(v)

Assumed exposure levels for respiratory protection selection are based on activities performed [see Table 1 in paragraph (f) and the listed tasks in paragraph (d)(2)(i)]

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Assumed Exposure Levels for Interim Control Measures

- Assume exposure levels $< 10\times$ PEL ($500\ \mu\text{g}/\text{m}^3$) if performing:
 - ◆ Manual demolition of structures
 - ◆ Manual scraping
 - ◆ Manual sanding
 - ◆ Heat gun applications
 - ◆ Power tool cleaning with dust collection systems
 - ◆ Spray painting with lead
- Also, protect as if exposure $< 10\times$ PEL if exposure not listed above but anticipated to be $>$ PEL
- Implement interim control measures

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Assumed Exposure Levels for Interim Control Measures

- Assume exposure levels $> 10\times$ PEL ($500\ \mu\text{g}/\text{m}^3$) if:
 - ◆ Using lead-containing mortar OR lead burning
 - ◆ Performing:
 - ◆ Rivet busting
 - ◆ Power tool cleaning without dust collection systems
 - ◆ Cleanup activities where dry expendable abrasives are used
 - ◆ Abrasive blasting enclosure movement/removal
- Implement interim control measures

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Assumed Exposure Levels for Interim Control Measures

- Assume exposure levels > 50× PEL (2,500 $\mu\text{g}/\text{m}^3$) if performing:
 - ◆ Abrasive blasting
 - ◆ Welding
 - ◆ Cutting, and
 - ◆ Torch burning
- Implement interim control measures

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Lead Control Measures

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Lead in Construction Requirements

- Competent person
- Written compliance program
- Air monitoring
- Engineering and work practice controls
 - ◆ Enclosures
 - ◆ Mechanical ventilation
 - ◆ Chemical strips
 - ◆ Wet methods
- Administrative controls



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Negative-Pressure Ventilation Control Measures



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Dry Sweeping/Shoveling Lead Debris



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Bridge Renovation



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Donning PPE



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Abrasive Blasting Helmet



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Respirators

- Comply with MIOSHA Part 451, Respiratory Protection
- Provide per Table 1 and assure use when:
 - ◆ Exposures greater than PEL
 - ◆ Controls ineffective
 - ◆ Employee requests
 - ◆ As interim protection
- Proper selection
- Medical evaluation
- Fit testing
- Written respirator program

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Protective Clothing

- When exposures > PEL, skin/eye irritation
- Coveralls, gloves, hats/head covers, shoes/shoe coverings, eye and/or face protection
- Interim protection
- At no cost and assure its use!

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Protective Clothing

- Clean at least weekly, daily if exposures $>200 \mu\text{g}/\text{m}^3$
- Remove/store/label clothing on site
- Store in closed, labeled containers
- Inform outside launderer in writing
- Prohibit cleaning by blowing, shaking

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Housekeeping

- Maintain surfaces as lead free as practical
- Clean-up by HEPA vacuuming
- Shoveling, dry sweeping, wet sweeping only where vacuuming tried and ineffective
- No compressed air for cleaning unless controlled by ventilation

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Hygiene Facilities

- Prohibit eating, drinking, tobacco products, cosmetics where exposures > PEL
- Clean change areas with separate storage areas for clean/dirty clothing
- All contaminated clothing/equipment stays on-site
- Shower required when exposures > PEL
- Eating facilities needed when > PEL
- Hand washing facilities – always!

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Medical Surveillance

- Make initial medical surveillance available to employee exposed \geq action level on any day
 - ◆ Blood lead levels
 - ◆ Zinc protoporphyrin (ZPP) levels
- Implement medical surveillance program (biological monitoring) if:
 - ◆ Exposed \geq action level for > 30 days in any 12 months
- Licensed physician and at no cost

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Biological Monitoring

Blood lead and ZPP analysis:

- Initially for any exposed \geq action level
- Any exposed \geq action level for > 30 days in any consecutive 12 months
 - ◆ At least every two (2) months for the first six (6) months AND
 - ◆ Then every six (6) months thereafter
- At least every two (2) months if last blood sample $\geq 40 \mu\text{g/dl}$ (micrograms per deciliter) – continue until two (2) consecutive samples $< 40 \mu\text{g/dl}$
- At least monthly if on medical removal protection

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Medical Surveillance Examinations and Consultations

- Required when airborne level \geq action level for > 30 days and:
 - ◆ Blood level $\geq 40 \mu\text{g/dl}$ (annual)
 - ◆ Toxicity symptoms or breathing problems
 - ◆ Medical advice regarding pregnancy
- Info to physician (i.e., work history, lead exposures, habits/hobbies)
- Second opinion/multiple physician reviews
- Written opinion
- Chelation

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Medical Removal Protection

- Removal or special limitations
- Maintain all benefits and pay for up to 18 months
- Mandatory when airborne level > action level and:
 - ◆ Two consecutive blood lead tests > 50 µg/dl
 - ◆ Physician's final medical determination
- Voluntary removal
- Return to former job assignment
 - ◆ Two consecutive blood tests < 40 µg/dl
 - ◆ Revised medical determination

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Lead – Employee Information and Training

- Exposures less than Action Level:
 - ◆ 1926.62 (I)(1)(i): Hazard Communication
- Additionally, provide:
 - ◆ Specific training program (seven components)
 - ◆ At time of or prior to job assignment for exposures:
 - ◆ Equal to or greater than the Action Level on any day, OR
 - ◆ Exposed to lead compounds that are skin/eye irritants (e.g., lead arsenate, lead azide)
 - ◆ Annual refresher training

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Lead Training Program

1926.62 (l)(2): Lead Training Program (Exposures \geq Action Level)

- Contents of this standard and its appendices
- Specifics of operation where exposure \geq AL
- Respirators (reason, type, fit, use and limitations)
- Medical surveillance program (purpose and description)
- Engineering controls and work practices
- Contents of any lead compliance plans
- Chelating agents
- Rights to records (air monitoring, medicals) and information

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Signs

- Signage when exposures $>$ PEL
- Must contain:
 - ◆ WARNING
 - ◆ Lead Work Area
 - ◆ Poison
 - ◆ No Smoking or Eating

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Recordkeeping

■ Addresses:

- ◆ Monitoring data, including respirator information and environmental conditions
- ◆ Medical surveillance records
- ◆ Medical removals
- ◆ Monitoring exemption data

■ Retention periods:

- ◆ Exposure records and objective data – > 30 years
- ◆ Medical records – duration of employment plus 30 years

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Appendices

■ For informational purposes only

- ◆ Appendix A: Substance data
- ◆ Appendix B: Summary of the Standard
- ◆ Appendix C: Medical Surveillance Guidelines
- ◆ Appendix D: Qualitative & Quantitative Fit-Test Protocols

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Helpful Hints!



When in doubt: TEST IT! (You are responsible!)
Lab analysis may be best method!!

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Helpful Hints!



Use wet methods or chemical strip to reduce/control lead dust.

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Helpful Hints!



Use local exhaust ventilation
with HEPA filtration!



Lead-Based Paint (LBP) Abatement Training and Certification

- Lead Abatement Act/Lead Hazard Control Rules
- Michigan Department of Community Health
 - ◆ Lead Hazard Remediation Program
 - ◆ Mitchell Speers
 - ◆ speersm@michigan.gov
 - ◆ 517-373-9065
 - ◆ www.michigan.gov/leadsafe
- Accreditation and certification requirements, similar to asbestos, now required in Michigan

LBP Abatement Accreditation and Certification

- Training and certification:
 - ◆ Lead Supervisor
 - ◆ Lead Worker
 - ◆ Certification fees
 - ◆ Inspector and Risk Assessor – clearance testing
- Sampling requirements
- Accredited trainers
- Project notification requirements
- “Activity reports” required of certified Inspectors and Risk Assessors

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Renovation, Repair & Painting (RRP) Program

- Any contractor disturbing 6 square feet of paint in a house built before 1978 is required to be an EPA "certified Firm" and use "Certified Renovators" that have taken the RRP 8 hour training.
- www.epa.gov/lead
- National Lead Information Center
Hotline: 800-424-LEAD (5323)

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Assessment

- The purpose of this assessment is to validate the knowledge learned in class.
- Passing score of 70% correct is required.
- Class reference materials/books are not allowed to be used during the assessment.
- Collaboration/discussion with others is not allowed during the assessment.
- Answers will be reviewed after everyone completes and submits their assessment.

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Online Transcript

<https://webadvisor.macomb.edu>

What?

- Check individual courses – Proficient / Not Proficient
- Track courses taken through the MTI
- Request a transcript to show certification
- Manage account information

How?

- Select *What's My User ID?*
- Key in the Last Name and SS# or Macomb ID
- Select *Log In*
- If you need help call 586-445-7506 or email scwebreg@macomb.edu

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Thank You For Attending This Presentation

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and training services, call (517) 284-7720

or

visit our website at www.michigan.gov/miosha



www.michigan.gov/lara



Asbestos & Lead Awareness

Student Resources

MIOSHA Standards:

[Part 602. Asbestos Standards for Construction](#)

[Part 603. Lead Exposure in Construction](#)

MIOSHA Fact Sheets:

[Asbestos in Construction](#)

[Lead Exposure in Construction](#)

[MIOSHA & EPA Lead Rules: What's the Difference?](#)

Other Resources:

[Federal OSHA Information on Asbestos](#)

[Federal OSHA Information on Lead](#)



Michigan Department of Licensing and Regulatory Affairs
Michigan Occupational Safety & Health Administration
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