MSBO 21st Annual
Facilities/Operations Director Conference & Expo

Environmental Health & Safety Presentation

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Overview

- Asbestos
- Lead
- Integrated Pest Management
- Hazard Communication
- Indoor Air Quality
- Confined Spaces
- Lockout/Tagout
- Silica

Overview: Asbestos

- Properties/Characteristics
  - Fibrous mineral incorporated into building components over the past 100 years;
  - Has been put into as many as 3,500 different products, including but not limited to, fireproofing, plasters, insulation, ceiling tiles, flooring, caulks, mastics and coatings;
  - Primary concern to humans is exposure through the inhalation of airborne fibers.

Overview: Asbestos

- Health Hazards
  - Various types of cancers and diseases have been associated with asbestos exposure, including Asbestosis, Mesothelioma and Lung Cancer, Larynx Cancer;
  - Asbestos health risks are primarily chronic in nature;
  - Cancers and diseases usually associated with higher levels of asbestos exposure.

Overview: Asbestos

- Regulation
  - Highly regulated within public/commercial buildings, especially K-12 Schools;
  - Regulatory compliance is a time consuming process for Facility Directors;
  - "Designated Person" responsibilities.

Overview: Asbestos

- General Summary of Regulations
  - Training
  - Notification (employees & outside contractors)
  - Personal Protective Equipment
  - Renovation/Demolition
  - Recordkeeping

Overview: Asbestos

- Summary
  - Asbestos not only a regulatory issue but an emotional and public relations issue also;
  - Significant resource allocation may be necessary;
  - Recordkeeping can be overwhelming;
  - Need adequate training for Designated Person;
  - Special consideration when renovation is scheduled (Bond Issues).
Overview: Asbestos

- No Ban on Asbestos in the United States!
- (with exception of spray-on fireproofing and most TSI, late '70s and vinyl sheeting, late '80s).
- Recent interpretations by EPA state that prior to renovation or demolition, newer buildings need to conduct bulk sampling of building components. CANNOT USE MANUFACTURER/INSTALLER DOCUMENTATION.

Overview: Asbestos Regulation Listing

- Federal
  - EPA AHERA (40 CFR Part 763)
  - EPA NESHAPs (40 CFR Part 61)
  - OSHA Construction Standard (29 CFR Part 1926.1101)
- State of Michigan
  - Michigan Public Act 135 of 1986 (Contractor Licensing)
  - Michigan Public Act 440 of 1988 (Worker Accreditation)
  - Act 92 of 1993 (Seller's Disclosure)
  - Rule 6601 (General Duty Clause)

Overview - Asbestos

- Additional Resources
  - www.epa.gov/asbestos/asbestos_in_schools. html

Lead

Overview - Lead

- A naturally occurring bluish-gray, soft metal found in small amounts in the earth's crust. Leads pliable soft characteristics made it valuable to manufacturers for incorporation into a wide variety of products including but not limited to, pipes, rods, paints and containers.

History of Lead

- Used for thousands of years
- Understanding of lead poisoning has changed with the increased sensitivity of measuring instruments and better understanding of related symptoms
- Between the mid-1960s and the late-1970s the defined level of toxicity had declined 50%
Sources of Lead in the Environment

Lead Sources
- Air
- Soil and Dust
- Drinking Water
- Food

Occupational Lead Exposure
- Plumbers
- Pipe fitters
- Lead miners
- Auto repairers
- Shipbuilders
- Printers
- Policemen
- Lead smelters
- Steel welders
- Steel cutters
- Construction workers
- Demolition workers
- Bridge workers
- Rubber/battery manufacturers

Hobby Lead Exposure
- Glazed pottery making
- Target shooting (firing ranges)
- Lead soldering (electronics)
- Painting
- Cosmetics
- Preparing lead shot, fish sinkers
- Stained-glass making
- Car/Boat repair
- Home remodeling
- Folk remedies
- "Health foods"

Routes of Entry
- Gastrointestinal absorption
- Respiratory absorptions

Targeted Organs
- Central Nervous System
- Peripheral Nervous System
- Reproductive System
- Kidneys
- Blood
Lead Risk Assessment

- What is it?
  - On-site investigation by a Michigan Certified Lead Risk Assessor to determine if a lead-based paint hazard is present.
- How is it done?
  - Visual evaluation and testing, including XRF tests, dust samples, a soil sample and possibly a water sample.
- What is a lead-based paint hazard?
  - Non-intact lead-based paint, elevated dust wipe samples, elevated soil sample, elevated water sample.
- What does it look like?
  - Written report (very long and very technical) that is required to have an easy to read, plain language conclusion section near the front of report that describes any known or potential lead-based paint hazards identified.

Lead Risk Assessment

- When are they required in schools?
  - During the application process for obtaining a child care license in a building constructed prior to 1978.

Lead Risk Assessment

- What it isn’t:
  - It is not a lead inspection. A lead inspection is a surface by surface investigation to determine the presence of lead-based paint in target housing or child occupied facilities. A risk assessment is intended to identify lead-based paint hazards.
  - Neither a lead inspection or risk assessment are associated with the EPA’s Renovation, Repair and Painting (RRP) Rule.
RRP Rule
- EPA law that became effective in April, 2010.
- Applies to all "Child Occupied Facilities", where kids under 6 regularly attend. Included are Kindergarten Rooms, Pre-School Rooms and common areas such as hallways, restrooms and Gyms in applicable buildings.
- Only for buildings constructed before 1978

Lead In Water
- How should School Districts comply?
  - XRF testing of painted components in Elementary Schools prior to renovation;
  - Ensuring outside contractors who do work in Elementary Schools are Certified Firms and have Lead Certified Workers;
  - Consider training and licensing is performing in-house work in Elementary Schools.

Why Focus on Water Now?
- Flint Water Crisis:
  - Began in 2014.
  - International media attention
  - Caused by insufficient water treatment during change in water source
  - Elevated lead partially caused by the Michigan Department of Environmental Quality's (MDEQ) mistakes. The MDEQ appears to be overcompensating.

Why Focus on Water Now?
- PFAS (Per- and polyfluoroalkyl substances):
  - "Forever chemicals" that repel water, oil and resist heat
  - Used in Teflon, Scotchgard and fire suppressant (military)
  - Causes health issues in humans, including cancer
  - Break down slowly, therefore, accumulate in body and environment
  - Found in rivers, lakes, soil, groundwater, drinking water, fish, food, bodies and Great Lakes
  - Found throughout Michigan
  - Very low levels are an issue (ppt)
  - Ongoing screen testing by the MDEQ occurring at this time
  - Schools on well water being tested
Why Focus on Water Now?

- Detroit Public School Issues:
  - Testing during summer of 2016 showed widespread elevations for lead and copper
  - As a result, DPS shut off drinking water for all buildings. Hit national news.
  - Short term solution is providing bottled water.
  - Long term solution is to install “hydration stations”, dedicated drinking water filtration systems. (collecting corporate donations)

So, Who is Required to Test in Schools?

- Noncommunity Water Supply
  - Primarily well supplied water
  - Required to test for lead, copper and coliform periodically (Lead & Copper Rule)
  - Has been in effect for years
  - LCR has been revised in summer of 2018
    - lowers lead action level to 12 ppb by 2025
    - Community water supplies are now responsible for lead service lines from the main to the building house
    - Communication requirements, (notifications more stringent)
  - Considered most stringent in nation

What is MDEQ Saying?

- MDEQ recommends that School Districts on Community Water test their buildings
- Providing strategies for addressing issues with drinking water in Schools.
  - Map plumbing in each building
  - Test drinking water periodically
  - Establish water flushing protocol

What is MDEQ Saying?

- Developed series of webinars for Schools
- Webinars:
  - Introduction to the Michigan School Water Training Program webinar
  - Know Your Plumbing System and How to Develop an Investigative Drinking Water Sampling Plan
  - How to Sample Your School’s Drinking Water for Coliform Bacteria, Lead and Copper
  - Get the Water Moving and Best Management Practices

IF YOU ARE ON COMMUNITY WATER (NO WELL), NO REGULATION OR REQUIREMENTS TO TEST WATER IN SCHOOLS!
Concerns with MDEQ Recommendations/Strategies

- Mapping Plumbing
  - Will be difficult, complex and will take resources

- 5 parts per billion (ppb) recommendation
  - 1/3 of Action Level of 15 ppb by EPA, other 50 States (I believe) and State of Michigan, (including water source requirements)
  - Keep in mind, recent revisions to Michigan LCR will be 12 ppb beginning in 2025
  - Places School Districts in difficult situation, (not required to test, but if you do, do you use the 5 ppb recommendation or 15 ppb EPA/State Action Level?)

So, What Are School Districts Doing?

- Many Districts tested their water in 2016/2017 as a result of the Flint Water Crisis. Testing usually 3-7 samples per building. Enough testing to show results to Administration, Board, Staff and Media, but less than MDEQ recommendations, which would be expensive.
- Many Districts retested recently due to DPS publicity and Free Press FOIA

Overview - Lead

- Additional Resources
  - www.Michigan.gov/schoolwater

Lead Regulations

Integrated Pest Management (IPM)

- Properties/Characteristics
  - IPM is an approach to pest control that utilizes regular monitoring and recordkeeping to determine if and when treatments are needed.
  - Primary intent of an IPM program is to protect human health by suppressing pests that cause disease.
  - IPM covers ants, cockroaches, moths, beetles, fleas, flies, lice, rats, mice, silverfish, spiders, wood damaging pests, yellowjackets, hornets, lawns, tree shrubs and weeds.
Integrated Pest Management

- Why have an IPM program?
  - Reduces the use of pesticides used on school grounds;
  - Prevents unnecessary exposure to pesticides;
  - Provides a notification process to the community;
  - Reduces the cost of pest management

Integrated Pest Management

- Regulation
  - Michigan Public Act 451 of 1994, Part 83
    - Requires Schools to implement and manage an IPM Program;
    - Requires Schools to maintain a registry of parents for notification purposes;
    - Requires Schools to provide annual notification to parents of the IPM Program and Registry of parents.

Integrated Pest Management

- Regulation
  - Department of Agriculture, Regulation #637
    - Special requirements for applicators within Schools;
    - Licensing requirements;
    - Training requirements;
    - Specific guidelines for application of pesticides.

Integrated Pest Management

- IPM Strategies
  - Biological approach
  - Physical approach
  - Mechanical approach
  - Educational approach
  - Chemical approach

Integrated Pest Management

- Summary
  - Schools Districts need to develop written program;
  - School Districts need to provide applicable notification to parents/community;
  - Ensure that pesticides are used as a last resort;
  - Pesticide applicators are properly trained.

Integrated Pest Management

- Additional Resources
  - https://www.epa.gov/managing-pests-schools
Hazard Communication

- Properties/Characteristics
  - Ensure that the hazards of all chemicals produced by or imported by chemical manufacturers or importers are evaluated, and that information concerning their hazards is transmitted to affected employers and employees.

Hazard Communication

- Written Program
  - Employers must develop and implement a written Hazard Communication Program
  - Program must include but not be limited to:
    - List of hazardous chemicals known to be present
    - Methods the employer will use to inform employees of the hazards of non-routine tasks
    - Methods the employer will use to inform outside contractors of hazardous chemicals in the workplace.

Hazard Communication

- OLD: Material Safety Data Sheets (MSDS)
  - Chemical manufacturers and importers shall obtain or develop a MSDS for each hazardous chemical they produce or import. Employers shall have a MSDS for each hazardous chemical which they use.

- NEW: Safety Data Sheets (SDS)
  - Same information as MSDSs but standardized into sixteen sections.

Safety Data Sheets (SDSs)

New 16-section standardized SDS format required (ANSI Z400.1)

Section 1 - Identification
Section 2 - Hazard(s) Identification
Section 3 - Composition / Information on Ingredients
Section 4 - First-aid Measures
Section 5 - Fire-fighting Measures
Section 6 - Accidental Release Measures
Section 7 - Handling and Storage
Section 8 - Exposure Controls / Personal Protection
Section 9 - Physical and Chemical Properties
Section 10 - Stability and Reactivity
Section 11 - Ecological Information
Section 12 - Disposal Consideration
Section 13 - Transport Information
Section 14 - Regulatory Information
Section 15 - Other Information
Section 16 - Other Information

Safety Data Sheets

Section 1 - Identification:
Identifies the chemical on the SDS as well as the recommended uses. It also provides the essential contact information of the supplier.

Section 2 - Hazards Identification:
- Hazards of the chemical presented on the SDS
- Appropriate warning information associated with those hazards.
Safety Data Sheets

Section 3 - Composition / Ingredients:
Identifies the ingredient(s) contained in the product indicated on the SDS, including:
- Impurities and stabilizing additives.
- Information on substances, mixtures, and all chemicals where a trade secret is claimed.

Section 4 - First-Aid Measures:
Describes the initial care that should be given by untrained responders to an individual who has been exposed to the chemical.

Section 5 - Fire-Fighting Measures:
Provides recommendations for fighting a fire caused by the chemical.

Section 6 - Accidental Release Measures:
Provides recommendations:
- Appropriate response to spills, leaks, or releases, (e.g., containment and cleanup practices)
- Response for large vs. small spills, if different.

Section 7 - Handling and Storage:
Provides guidance on the safe handling practices and conditions for safe storage of chemicals.

Section 8 - Exposure Controls / Personal Protection:
Indicates the exposure limits, engineering controls, and personal protective measures that can be used to minimize worker exposure.

Section 9 - Physical and Chemical Properties:
Identifies physical and chemical properties associated with the substance or mixture.

Section 10 - Stability and Reactivity
Describes the reactivity hazards of the chemical and the chemical stability information. Includes: reactivity, chemical stability, and other.

Safety Data Sheets

Section 11 - Toxicological Information:
Identifies toxicological and health effects information or indicates is data unavailable.

Section 12 - Ecological Information*
Section 13 - Disposal Consideration*
Section 14 - Transport Information*
Section 15 - Regulatory Information*
*Sections are outside of MISHA jurisdiction but must be included for a GHS compliant SDS.

Hazard Communication

- Training
  - Training to include at least the following:
    - Methods and observations that may be used to detect the presence or release of a hazardous chemical in the work area.
    - The physical and health hazards of the chemicals in the work area.
    - The measures which employees can take to protect themselves from these hazards.
    - Details of the hazard communication program developed by the employer.
Hazard Communication

- Regulation
  - Michigan Right To Know

Hazard Communication

- Summary
  - Ensure that all employees are properly trained;
  - Ensure that teaching materials, (Science Rooms) are included;
  - Ensure that SDSs are accessible to all applicable staff;
  - Ensure written program is on file;
  - Consider On-Line SDS Systems.

Pictograms

GHS - Hazard Pictograms and correlated exemplary Hazard Classes

- Physical Hazards
  - Explosives
  - Flammable Liquids
  - Flammable Gases
  - Oxidising Gases
  - Corrosive to Metals

- Health Hazards
  - Acute Toxicity
  - Skin Corrosive
  - Skin Irritant
  - CMR* (H331) Respiratory Hazards

- Em. Hazards
  - Harmful to the Aquatic Environment

GHS Label

- Identity
- Signal Word
- Hazard Statements
- Manufacturer or Distributor

This Workplace Covered by the Michigan Right To Know Law

New or Revised SDS

As Required by the Michigan Right To Know Law

SDS(s) For This Workplace Are Located At

- LARA
- CLMRRD

Prepared by specific for SDS:

Phone

11
Hazard Communication

- Additional Resources
  - https://www.michigan.gov/lara/0,4601,7-154-89334_11407_15317-371935--,00.html

Indoor Air Quality (IAQ)

IAQ Overview

- Why the increase of IAQ problems?
  - 1970's Energy Efficiency Mentality
  - Increase in allergies, asthma and other respiratory concerns
  - Increased awareness of environmental concerns, (i.e. Mold)
  - Increased knowledge of building occupants

IAQ

- Acceptable Indoor Air Quality:
  - "Air in which there are no known contaminants at harmful concentrations as determined by cognizant authorities and with which a substantial majority (80% or more) of the people exposed do not express dissatisfaction."
  - (Taken from "Ventilation for Acceptable Indoor Air Quality", ASHRAE 62 – 1999)

- IAQ Issues in Schools
  - Unacceptable IAQ, one person complaining
  - No IAQ regulations/Tools for Schools
  - Increased resources need to be allocated

IAQ

- Is IAQ a new issue?
  - "In the construction of buildings, whether for public purposes or as dwellings, care should be taken to provide good ventilation and plenty of sunlight...schoolrooms are often faulty in this respect. Neglect of proper ventilation is responsible for much of the drowsiness and dullness that...make the teachers work toilome and ineffective"
Quote from the Health Reformer

1871

IAQ
- Properties/Characteristics
  - Four Factors that affect IAQ
    - Pollutant Source
    - HVAC System
      - Commonly the cause and solution to IAQ concerns
    - Pollutant Pathways
      - From source to occupants
    - Building Occupants
      - Complaints

IAQ
- Typical causes of IAQ concerns within Schools
  - Lack of ventilation/fresh air
  - Housekeeping/general cleanliness
  - Mold/moisture intrusion
  - Odor-generating activities, (kitchens, tunnels, locker rooms, etc.)
  - Human activities (from pets to plants)

IAQ
- Typical symptoms
  - Fatigue
  - Headaches
  - Respiratory ailments
  - Sinus issues
  - Itchy, scratchy throats, eyes

IAQ
- Ten things you should know about mold
  - Potential health effects and symptoms associated with mold exposure include allergic reactions, asthma and other respiratory complaints.
  - There is no practical way to eliminate all mold and mold spores in the indoor environment; the way to control mold growth is to control moisture.
  - If mold is a problem, you must clean up the mold and eliminate sources of moisture.
  - Fix the source of the water problem or leak to prevent mold growth.
IAQ

- Ten things you should know about mold
  - Reduce indoor humidity (to 30%-60%) to decrease mold growth by:
    - Venting bathrooms, dryers and other moisture generating sources to the outside
    - Using air conditioners and de-humidifiers
    - Increasing ventilation
    - Using exhaust fans

IAQ

- Ten things you should know about mold
  - Clean and dry any damp or wet building materials and furnishings within 24 hours to prevent mold growth.
  - Clean mold off hard surfaces and dry completely. Absorbent materials such as ceiling tiles, that are moldy, may need to be replaced.

IAQ

- Ten things you should know about mold
  - Prevent condensation: Reduce the potential for condensation on cold surfaces (i.e. windows, piping, exterior walls, roof or floors) by adding insulation.
  - In areas where there is a perpetual moisture problem, do not install carpeting.
  - Molds can be found almost anywhere; they can grow on virtually any substance, providing moisture is present.

IAQ

- Summary
  - Consider written program of complaint and response forms;
  - Ensure custodial and maintenance staff are properly trained, (majority of IAQ issues stem from housekeeping);
  - Handle complaints matter-of-factly;
  - Do not underestimate emotions of IAQ.

IAQ

- Additional Resources
  - http://www.epa.gov/iaq/schools/pubs.html

Suggestions for Reducing Mold Growth in Large Buildings

- Reduce Indoor Humidity
- Inspect Building for Signs of Mold, Moisture, Leaks or Spills
- Respond Promptly When Signs of Mold or Leaks are Present
- Prevent Moisture Condensation
- Floor and Carpet Cleaning
Confined Space Program

Definition of Confined Space

- Confined Space must have the following three characteristics:
  - Is large enough and so configured that an employee can bodily enter and perform assigned work; and
  - Has limited or restricted means of entry or exit; and
  - Is not designed for continuous employee occupancy

Examples of Confined Spaces

- Tanks
- Vessels
- Silos
- Storage bins
- Hoppers
- Vaults
- Pits

Examples of Confined Spaces in School Districts

- Tunnels
- Crawl Spaces
- Unexcavated Areas
- Ventilation Shafts
- Sewers
- Boilers

Categories of Confined Spaces

- Confined Spaces
- Permit Required Confined Space
- Non-Permit Required Confined Space

Permit-Required Confined Space

- Confined space that has one or more of the following characteristics:
  - Atmospheric Hazard
  - Engulfment Hazard
  - Internal Configuration Hazard
  - Other Recognized Hazards
Atmospheric Hazard
1. "Contains or has a potential to contain a hazardous atmosphere"
   - Examples
     - Oxygen deficiency (less than 19.5%)
     - Oxygen enrichment (over 23.5%)
     - Flammable gases or vapors
     - Potential toxic air contaminants

Engulfment Hazard
2. "Contains a material that has the potential for engulfing an entrant"
   - Examples
     - Liquid
     - Finely divided solid

Internal Configuration Hazard
3. "Has an internal configuration such that an entrant could be trapped or asphyxiated by inwardly converging walls or by a floor which slopes downward and tapers to a smaller cross-section"
   - Examples
     - Hoppers
     - Restrictive tunnels/crawl spaces

Other Recognized Hazards
4. "Contains any other recognized serious safety or health hazard"
   - Examples
     - Electrical Hazard
     - Thermal burn Hazard
     - Chemical Hazard
     - Environmental Hazard(s)

Non-Permit Confined Space
- "means a confined space that does not contain or, with respect to atmospheric hazards, have the potential to contain any hazards capable of causing death or serious physical harm"

General Requirements of Standard
- Systematically identify confined spaces
- Determine whether permit or non-permit spaces
- Restrict employee access/post warning signs
- Control potential hazards
- Verify safe conditions during confined space entry, work and exit
Permit Spaces
Sign Postings

- "DANGER, PERMIT-REQUIRED
CONFINED SPACE, DO NOT ENTER"

Outside Contractor

- Obtain available information on hazards
  and entry operations from the host
  employer
- Coordinate entry and work operations with
  the host employer
- Inform the host employer of the permit
  program followed and hazards confronted
  by or created during entry

Permit Space Program

- Implement measures to prevent
  unauthorized entry
- Identify and evaluate permit space hazards
- Develop practices for safe entry operations
- Provide, maintain and ensure proper use of
  entry equipment
- Test and evaluate permit spaces for
  acceptable entry conditions

Permit Space Program
(Continued)

- Provide a least one attendant outside
  permit spaces
- Provide procedures for emergency
  response by attendant
- Designate persons for entry operations,
  provide training
- Develop procedures for summoning rescue
  and emergency services

Permit Space Program
(Continued)

- Develop written permit system
- Develop procedures for concluding
  entry
- Review entry procedures and revise
  program and needed
- Review program and cancel permit
  annually for compliance
Control of Hazardous Energy Lockout/Tagout Program

Overview of Regulation

- Covers all maintenance and servicing operations where the unexpected energization or start up of a machine (or equipment) or release of stored energy could cause injury to an employee

Overview of Regulation

- Normal production operations are not covered by this standard
- Servicing and/or maintenance which take place during normal production operations is covered only if
  - Employee is required to remove or bypass a guard or other safety device; or
  - Employee is required to place any part of his/her body in a "point of operation" or associated danger zone

Overview of Regulation

- Standard does not cover the following:
  - Construction, agriculture and maritime
  - Installations under exclusive control of electric utilities
  - Exposure to electrical hazards from work on electrical utilization installations
  - Oil and gas well drilling and servicing

List of Primary Components

- Employer instituted energy control program
- Lockout/Tagout
- Full employee protection
- Energy control procedures
- Protective materials
- Periodic inspection
- Training and Communication
- Application and control measures
- Release from Lockout Tagout
- Additional requirements
  - Testing/positioning
  - Outside personnel
  - Group lockout/Tagout

Employer Instituted Energy Control Program

- Employer to establish written program
- Machine/equipment must be isolated from energy sources prior to employees performing servicing or maintenance
- The objectives of the program are accomplished by addressing the primary components of the standard
Lockout/Tagout
- If energy isolating device is not capable of being locked out, a tagout system shall be used
- If energy isolating device can be locked out, lockout shall be utilized unless employer demonstrates that tagout will provide "full employee protection"
- After January 2, 1990, new machines/equipment or modified machines must accept a lockout device

Full Employee Protection
- Tagout devices to be placed in same location that lock would be attached
- Tagout program to provide a level of safety equivalent to that obtained by using a lockout program
- Specific procedures need not be developed for each machine/equipment, depending on factors identified within the standard

Full Employee Protection
- The employer must demonstrate that the tagout system will provide a comparable level of safety as the lockout system. This may be demonstrated by using additional means such as:
  - Removal of a isolating circuit element
  - Blocking of a controlling switch
  - Opening of an extra disconnecting device
  - Removal of a valve handle

Energy Control Procedures
- No specific procedures for a particular machine or equipment if all of the following elements exist:
  1. The machine/equipment has no potential for stored or residual energy or reaccumulation of stored energy after shut down when would endanger employee
  2. The machine/equipment has a single energy source which can be readily identified and isolated.
  3. The isolation and locking out of that energy source will completely deenergize and deactivate the machine or equipment

Energy Control Procedure
4. The machine/equipment is isolated from that energy source and lockout during servicing or maintenance
5. A single lockout device will achieve a locked out condition
6. The lockout device is under the exclusive control of the authorized employee performing the servicing or maintenance

Energy Control Procedure
7. The servicing or maintenance does not create hazards for other employees; and
8. The employer, in utilizing this exception, has had no accidents, involving the unexpected activation or reenergization of the machine or equipment during servicing or maintenance
Protective Materials & Hardware

- Employers shall provide locks, tads, chains, wedges, key blocks, adapter pins or other appropriate hardware
- Lockout/tagout devices shall be the only devices used for controlling energy and shall not be used for other purposes

Durable

- Must be durable enough to withstand:
  - Environmental conditions to which they are exposed
  - Weather conditions, such as wet or damp locations
  - Corrosive environments where chemicals are present

Standardized

- Lockout/tagout devices must be standardized in a facility by:
  - Color
  - Shape
  - Size
  - Print and format (tags)

Substantial

- Lockout devices must be substantial enough to prevent unauthorized removal without excessive force, such as with the use of bolt cutters
- Tagout devices just be substantial enough to prevent inadvertent or accidental removal
  - Non reusable (attachment device) - self locking
  - Attachable by hand - withstand 50 lbs

Identifiable

- Lockout/tagout devices must indicate the identity of the employee applying the device(s)
Example of Tagout Labels

- DO NOT START
- DO NOT OPEN
- DO NOT CLOSE
- DO NOT ENERGIZE
- DO NOT OPERATE

What is Crystalline Silica?

Common mineral that is found in materials that we see every day in roads, buildings and sidewalks. It is a common component of sand, stone, rock, concrete, brick, block and mortar, (quartz, cristobalite and tridymite).

What’s The Problem?

- Exposures to crystalline silica dust can occur in common workplace operations involving cutting, sawing, drilling and crushing of:
  - Concrete
  - Brick
  - Block
  - Rock
  - Stone

And....

- Exposures from operations using sand products, such as
  - Glass Manufacturing
  - Foundries
  - Sand Blasting
  - Hydraulic Fracturing

Why New Silica Standards?

- Have known about silica hazards for over 80 years;
- OSHA's Permissible Exposure Limit was more than 40 years old;
- Clear evidence that previous exposure limits did not adequately protect worker’s health;
- Epidemiological studies suggest that, at previous PEL, respirable crystalline silica exposure has been found to cause lung cancer and kidney disease;
- Many employers were already implementing necessary measures to protect workers from silica exposure.
And.....

- Approximately 2.3 million people in the US are exposed to silica at work, (majority in construction).
- OSHA estimates that new silica standards will save the lives of more than 600 workers each year.
- OSHA estimates that new silica standards will prevent more than 900 cases of silicosis each year once full effects of rules are implemented.

Two New OSHA Silica Standards

  - Covers general industry such as brick manufacturing, foundries and hydraulic fracturing (fracking).
- For fracking, fully implemented by June 23, 2018, except engineering control provisions, compliance date is June 23, 2021.
- Construction Industry – (29 CFR Part 1926.1053)
  - Covers construction industry, those who drill, cut, crush or grind silica containing materials.

Silica Construction Standard

- Regardless of exposure, employers are required to:
  - Establish and implement a written exposure control plan
  - Identify tasks that involve exposure and methods used to protect workers, including procedures to restrict access to work areas where high exposures may occur;
  - Designate a competent person
  - Encourage implementation of the written exposure control plan;
  - Implement Housekeeping Activities
  - Control practices that expose workers to silica where feasible alternatives are available.
  - Offer Medical exams
    - Including chest x-rays and lung function tests – every three years for worker who are required by the standard to wear respirators for 30 or more days per year;

Silica Construction Standard

- Train workers
  - Work operations that result in silica exposure and ways to limit exposure;
- Keep records
  - Documentation on worker’s silica exposure and medical exams.

Key Definitions

- Action Level
  - Concentration of airborne respirable crystalline silica of 25 micrograms per cubic meter (μg/m³) based on an 8-hour TWA.
- Competent Person
  - Individual who is capable of identifying existing and foreseeable respirable crystalline silica hazards in the workplace and who has authorization to take prompt corrective measures to eliminate or minimize them.
- Permissible Exposure Limit (PEL)
  - Concentration of airborne respirable crystalline silica of 50 μg/m³ based on an 8-hour TWA.

Crystalline Silica Hazards

- Respirable crystalline silica are very small particles typically at least 100 times smaller than ordinary sand found on beaches or playgrounds.
- Caused by high energy operations like cutting, sawing, grinding, drilling and crushing stone, rock, concrete, brick, block and mortar.
Crystalline Silica Hazards

- Classified as a human lung carcinogen, can cause lung cancer;
- Silicosis – Scarring of the lung tissue, reduced oxygen absorption. Can make one more susceptible to lung infections such as tuberculosis.
- Can cause Chronic Obstructive Pulmonary Disease (COPD).
- Can cause Kidney Disease and other Respiratory Diseases.

Silicosis

- Chronic/Classic Silicosis
  - 15 years to 20 years of moderate to low exposures to silica
  - Most common type
  - Symptoms include shortness of breath upon exerting and have clinical signs of poor oxygen/carbon dioxide exchange. In later stages, workers may experience fatigue, extreme shortness of breath, chest pain and respiratory failure
- Accelerated Silicosis
  - 5 years to 10 years of high exposures to silica
  - Symptoms include severe shortness of breath, weakness and weight loss
- Acute Silicosis
  - Several months to 2 years of extremely high exposures to silica
  - Symptoms include severe disabling shortness of breath, weakness and weight loss (often leads to death)

Table 1

- Flexible compliance option that effectively protects workers from silica exposure.
- Matches common construction tasks with dust control methods, including engineering controls, work practices and respiratory protection, in an effort to limit worker exposures to silica.
- If employers fully and properly implement Table 1, they are not required to measure respirable crystalline silica exposures to verify that levels are at or below the PEL for workers engaged in the Table 1 task.

In other words....

- If requirements of Table 1 are properly implemented for a given task, the employer will not need to conduct air monitoring or exposure assessments on their employees.

Equipment/Tasks Under Table 1

- Stationary masonry saws
- Handheld power saws
- Handheld power saws for cutting cement board
- Walk-behind saws
- Drillable saws
- Rig-mounted core saws or drills
- Handheld and stand-mounted drills
- Small drillable milling machines
- Crushing machines
- Dowel drilling rigs for concrete
- Vehicle-mounted drilling rigs for rock and concrete
- Jackhammers and handheld powered chipping tools
- Handheld grinders for mortar removal
- Handheld grinders for other uses
- Walk-behind milling machines and floor grinders
- Large drillable milling machines
- Heavy equipment and utility vehicles

Summary of Table 1

- Approximately half of tasks require an integrated water delivery system.
- Approximately half of tasks require shroud with dust collection system.
Table 1. Exposure Control Methods for Selected Construction Operations

<table>
<thead>
<tr>
<th>Operation</th>
<th>Engineering and Work Practice Control Methods</th>
<th>Required Air-Purifying Respirator (Minimum Assigned Protection Factor)</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Handheld power saw (any blade diameter)</td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>Used data-equipped with integrated water delivery system that continuously feeds water to the blade.</td>
<td></td>
</tr>
<tr>
<td></td>
<td>Cleaned and reconditioned in accordance with manufacturer's instructions to minimize dust emissions.</td>
<td></td>
</tr>
<tr>
<td></td>
<td>When used outdoors:</td>
<td></td>
</tr>
<tr>
<td></td>
<td>When used indoors or in an enclosed area:</td>
<td></td>
</tr>
<tr>
<td></td>
<td>Dust mask's N10</td>
<td>MPF 10</td>
</tr>
<tr>
<td></td>
<td>Dust mask's N10</td>
<td>MPF 10</td>
</tr>
</tbody>
</table>

If employer does not comply with Table 1

- Conduct assessments including air sampling to determine if levels are above the Action Level or PEL;
- Protect workers from silica exposure if above the PEL;
- Use dust controls to protect workers from exposure above the PEL;
- Provide respirators to workers when dust controls cannot limit exposures to the PEL.

Silica Web Page
http://www.osha.gov/silica

Handheld Saw Example

- If a worker uses the saw outdoors for four hours or less per day, no respirator would be required.
- If worker uses the saw for more than four hours per day or anytime indoors, he or she would be required to use a respirator with an assigned protection factor (APF) of at least 10 (half face or dust mask).

Exposure Monitoring for Silica

- When to perform air sampling for silica
  - For tasks not listed in Table 1
  - Employer does not fully and properly implement the engineering controls, work practices and respiratory protection described in Table 1
  - Employer wants historic exposure monitoring data
  - Reassessment of exposure required when there is a change in production, process, control equipment, personnel or work practices

Q & A