

Environmental Concerns in Buildings, What You Don't Know Can Hurt You

Presented by: David Regelbrugge, CIH, CSP

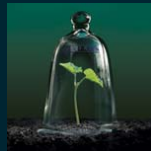
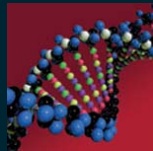
ENVIRON International Corporation



The youniversal
Facility Management Experience

Oct. 7-9, 2009
Orlando, Florida, USA

Environmental Concerns in Buildings, What You Don't Know Can Hurt You



IFMA's World Workplace 2009 Conference & Expo

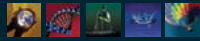
Orlando, Florida

October 7-9, 2009

Maintaining The Built Environment-Session 8.03

Presented by: David Regelbrugge, CIH, CSP

ENVIRON



Objective

- Review environmental concerns that building owners/managers are confronted with on a day-to-day basis and identify strategies that can be used to deal with these concerns.

ENVIRON



Potential Environmental Concerns in Buildings

Toxic Building Materials

- Asbestos
- Lead
- Mercury
- Formaldehyde
- Polychlorinated Biphenyls (PCBs)

Biological Concerns

- Mold
- Legionella
- Fungus & yeast

Toxic Gases & Vapors

- Radon
- Vapor Intrusion
- Exhaust gases

ENVIRON



Toxic Building Materials

ENVIRON



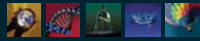
Asbestos

- **What is it?**
 - Natural occurring rock mineral
- **Where is it?**
 - Everywhere
 - Pipe and duct insulations
 - Sprayed-on fire proofing
 - Floor and ceiling tiles, etc
- **Years Used**
 - Primarily 1940 to early 1970
 - Non-friable through the 1980's



Source: Environ Stock Photos

ENVIRON



Asbestos

Uses:



Source: Environ Stock Photos

ENVIRON



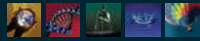
Asbestos

- **Route of entry**
 - Inhalation
- **Why is it hazardous?**
 - Asbestosis
 - Scaring of the lungs
 - Cancer
 - Lung
 - Mesothelioma



Source: Environ Stock Photos

ENVIRON



Asbestos

- **When was it banned?**
 - 1972 FDA banned use in clothing
 - 1973 EPA banned in sprayed on fire proofing
 - 1989 EPA tried comprehensive ban
 - Overturned by court ruling



Source: Microsoft Clip Art

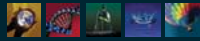
ENVIRON



Asbestos

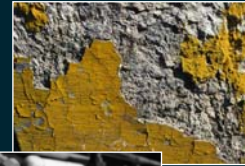
- **Strategies**
 - Complete inspection of building
 - Keep asbestos building materials in good condition
 - Rules of thumb:
 - Most asbestos insulations don't compress easily
 - Blue tint added to some newer fire proofing and insulations
 - Ensure that any removal is performed by licensed professional

ENVIRON



Lead

- **What is it?**
 - Naturally occurring metal
- **Where was it used in buildings?**
 - Paints
 - Pipes and Pipe Solders
 - Electronic Devices
 - Computers, Telephones, etc.
 - X-ray shielding
- **When was it used?**
 - 1900's to current date



Source: Microsoft Clip Art

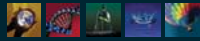
ENVIRON



Lead

- **Route of entry**
 - Ingestions
 - Inhalation
- **Why is it hazardous?**
 - Adverse health effects:
 - The Central Nervous System (CNS)
 - Learning disabilities in children
 - Reproductive system
 - Digestive system, etc

ENVIRON



Lead

- **When was it banned?**
 - 1978 Lead based paints banned
 - 1988 Plumbing solders
 - Not banned in electronic solders, yet



Source: Microsoft Clip Art

ENVIRON



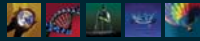
Lead

- **Strategies**
 - Know where lead may be located in your building?
 - Use lead swabs for screening
 - Tested prior to disturbing
 - Keep in good condition
 - If in pipes
 - Consider test drinking water
 - Use licensed contractor for removal
 - Disclosure of lead at closing
 - 1996 EPA requirement
 - Recycle old computers or other electronic devices



Source: Microsoft Clip Art

ENVIRON



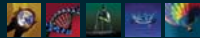
Mercury

- **What is it?**
 - Naturally occurring liquid metal
- **Where is it in buildings?**
 - Paints
 - Medical instruments
 - Switches, valves, etc.
 - Fluorescent light bulbs
 - Some electronic equipment
 - Some rubberized flooring
- **When was it used?**
 - ??? to current date



Source: Microsoft Clip Art

ENVIRON



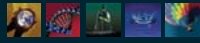
Mercury

- **Route of entry**
 - Inhalation
 - Lesser extent - skin absorption
- **How can I tell if I have mercury**
 - Visibly apparent
 - Laboratory testing
 - Direct reading instrument
- **Why is it hazardous?**
 - Adverse health effects on:
The Central Nervous System (CNS)



Source: ENVIRON Stock Photograph

ENVIRON



Mercury

- **When was it banned?**
 - Has not been completely banned in the US
 - States such as Maine have banned
 - Manufacturers have voluntarily removed it from most products

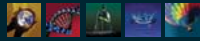
ENVIRON



Mercury

- **Strategies**
 - Substitution
 - Use mercury-free equipment & devices
 - If spill occurs
 - Contain and clean-up immediately
 - Prevent spill from being tracked into other areas
 - Do not dispose of into drains
 - Use experienced professionals clean-up and disposal

ENVIRON



Formaldehyde

- **What is it?**
 - Chemical that exist as a liquid or gas
- **Where is it in buildings?**
 - Adhesives
 - Varnishes
 - Insulations
 - Fabrics
 - Pressboard furniture
- **When was it used?**
 - ??? to current date



Source: Microsoft Clip Art

ENVIRON



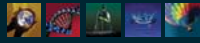
Formaldehyde

- **Route of entry**
 - Inhalation
- **How can I tell if I have formaldehyde?**
 - Warning Labels
 - Material Safety Data Sheets (MSDS)
 - Laboratory testing
 - Air monitoring
- **Why is it hazardous?**
 - Strong irritant of the eyes, nose, and throat
 - Nasal cancer



Source: Microsoft Clip Art

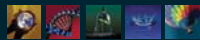
ENVIRON



Formaldehyde

- **When was it banned?**
 - Has not been banned in the US
 - Still found in many products
 - Many manufacturers are voluntarily removing it
- **Strategies**
 - Air monitoring
 - Use formaldehyde-free materials

ENVIRON



Polychlorinated Biphenyls (PCBs)

- **What are they?**
 - Manmade synthetic chemical
 - Resistant to degradation
 - Commercial grade PCBs are liquids (oil-like)
- **Where was it used in buildings?**
 - Insulating materials for electrical systems
 - Light ballast capacitors
 - Transformers
 - Caulk
 - When were they used?
 - Dates - 1930 to 1977



Source: UW Madison

ENVIRON

PCBs

- **Route of entry**
 - Ingestion
 - Inhalation
- **How can I identify PCBs?**
 - Labels
 - Laboratory testing
- **Why is it hazardous?**
 - Bioaccumulation
 - Adverse health effects:
 - Skin disease
 - Liver damage
 - Immune, reproductive and nervous system problems
 - Possibly carcinogenic

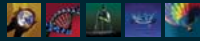


ENVIRON

PCBs

- **When were they banned?**
 - Banned in 1977
 - Ballast manufactured through 1979

ENVIRON

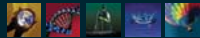


PCBs

■ Strategies

- Having the electric company check large transformers to determine if PCBs are present, if not already done so
- If you suspect you have PCB ballast
 - Inspect the label for the “NO PCBs” statement
 - Labels were required on ballast manufactured after 1979

ENVIRON



PCBs

■ Strategies

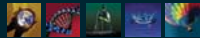
- Disposing of more than 12 to 16 (~ 1lb) ballast may triggers environmental reporting requirements
- Have professional environmental firm handle and dispose of waste
 - Remove capacitor from ballast to reduce weight
 - Incinerated waste

ENVIRON



Biological Concerns

ENVIRON



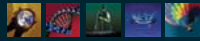
Mold

- **What is it?**
 - Naturally occurring
 - found both inside and outside buildings
- **Where can it be found in buildings?**
 - Everywhere especially on water damaged cellulosic building components
 - Plywood, wood, drywall, ceiling tiles, etc.



Source: ENVIROM Photograph

ENVIRON



Mold

- **Route of entry**
 - Inhalation of spores and/or other mold structures
 - Possibly chemicals produced by molds
- **Health effects**
 - Infections in individuals with compromised immune systems
 - Allergies and asthma
 - Other health effects currently debated

ENVIRON



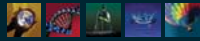
Mold

- **Strategies**
 - Mold is the result of a moisture
 - Address mold and moisture concerns immediately
 - Keep humidity below 60%
 - Seek professional help
 - If source of moisture cannot be identified
 - Growth exceeds more than 10 sq. feet



Source: ENVIRON Photograph

ENVIRON



Legionella

■ What is it?

- Gram negative bacteria
- Thrives in hot water
 - Ideal temp. 95°F to 115°F



Source: ENVIROM Photograph

■ Where can it be found in buildings?

- Cooling towers
- Potable hot water supply
- Possibly
 - Fountains
 - Hot tubs

ENVIRON



Legionella

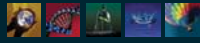
■ Route of entry

- Inhalation of mist/droplets

■ Health Effects

- Causes flu/pneumonia like symptoms
 - Legionnaires disease
- Those with compromised immune system most at risk
 - Hospitals, nursing homes, etc.

ENVIRON



Legionella

■ Strategies

- Cooling towers
 - Placed at a significant distance from the outside air intakes
- Test regularly
- Use biocides

ENVIRON



Dirty Birds & Bats

■ Roosting Birds & Bats

- Can leave a mess on roof tops, attics, etc.

■ Hazard

- Accumulated Waste

Histoplasma capsulatum

- Fungus
- grows in droppings

Cryptococcus neoforms

- Yeast grows in droppings

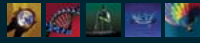
- When Inhale

Causes pneumonia like disease & symptoms



Source: Microsoft Clip Art

ENVIRON

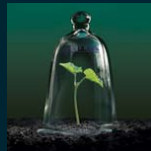
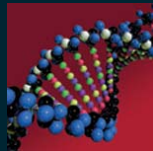


Dirty Birds & Bats

■ Strategies

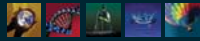
- Keep birds and bats out of building
- Excessive/aged dropping should be cleaned up by professional experience remediation firm

ENVIRON



Toxic Gases & Vapors

ENVIRON



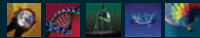
Radon

- **What is it?**
 - A colorless, odorless gas
 - Generated by the decay of naturally occurring radium
- **Where can it be found in buildings?**
 - Basement
 - Rooms that are slab on grade



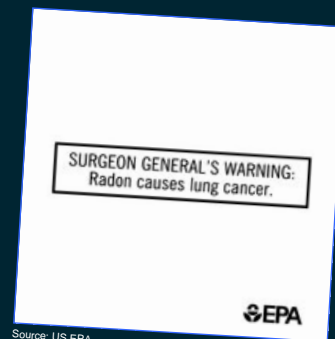
Source: ENVIRON Photograph

ENVIRON



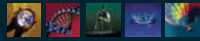
Radon

- **Route of entry**
 - Inhalation
- **Health Effects**
 - Lung cancer



Source: US EPA

ENVIRON

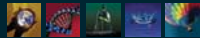


Radon

■ Strategies

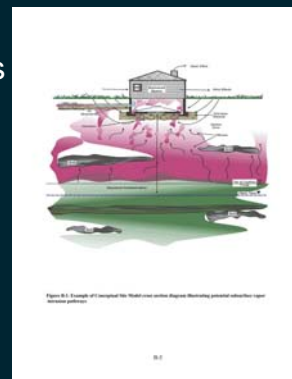
- Test
 - Basement areas
 - Slab on grade rooms
 - Use EPA approved laboratory
 - Perform long term test
- Elevated
 - >4 pCi/L
 - Seal all openings to prevent gas from entering the living space
 - Install sub-slab depressurization system

ENVIRON



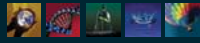
Vapor Intrusion

- **Past pollution**
 - Leaking underground storage tanks
 - Old dump sites
- **Vapors enter the building**
 - Similar to radon gas entering



Source: US EPA

ENVIRON



Vapor Intrusion

- **Health Effects**

- Unknown
- Possibly carcinogenic

- **Strategies**

- If suspected
 - Test basement areas or slab on grade rooms
- Elevated
 - Seal all openings to prevent gas from entering the living space
 - Install sub-slab depressurization system
 - Environmental clean-up

ENVIRON



Exhaust Intrusion

- **Gases Involved**

- Carbon monoxide
- Oxides of nitrogen
- Hydrogen Sulfide (sewer gas)

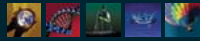
- **How They Enter**

- Cross contamination of the air handling system
- Open windows, cracks, plumbing systems
- Equipment used in the building
 - Heaters & stoves
 - Fork Trucks



Source: Microsoft Clip Art

ENVIRON



Exhaust Intrusion

■ Health Effects

- Irritation
- Obnoxious odor
- Headaches
- Nausea



Source: Microsoft Clip Art

■ Strategies

- Keep sources away from the ventilation intakes
- Maintain gas fired equipment
- Use electric equipment

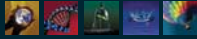
ENVIRON



Conclusion

Environmental concerns in buildings are numerous, being aware of the risks and how to handle them appropriately can reduce the likelihood of fines, serious injury/illness, and even death.

ENVIRON



ENVIRON



Contact Information

David Regelbrugge, CIH, CSP

Senior Manager, EH&S

ENVIRON International Corp.

333 W. Wacker Dr., Ste. 2700

Chicago, IL 60606

Ph: 312-288-3850

dregelbrugge@environcorp.com

ENVIRON