Centers for Disease Control and Prevention
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INDOOR ENVIRONMENTAL QUALITY

Maintaining Indoor Environmental Quality (IEQ) during Construction and Renovation

Construction and renovation projects in office settings can adversely affect building occupants by the release of airborne particulates, biological contaminants, and gases. Careful planning for IEQ and the prevention of exposure during these activities is essential.

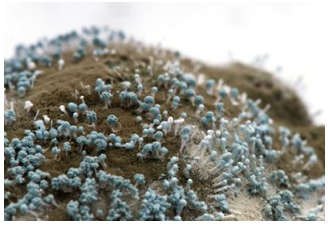
Particulates

Particulate material such as dusts and fibers are likely to be produced during construction and renovation activities. Sources include drywall, plaster, concrete, soil, wood, masonry, flooring, roofing, and ductwork. Non toxic dusts are irritants and can exacerbate lung conditions such as asthma and chronic obstructive lung disease.

Materials that contain fibers such as fiberglass composite materials or insulation can irritate the skin, eyes and respiratory tract when disbursed in the air and/or inhaled. Toxic dusts containing asbestos, polychlorinated biphenyls (PCBs) or lead can cause serious long-term health effects.

For all construction and renovation dusts, a plan to minimize exposure should be implemented. Appropriate containment should be in place to prevent disbursement into occupied areas. Certified and licensed contractors are required to conduct renovation.

Biological Materials



Chronic dampness from water intrusion leads to increased bacteria, mold and other microbes in a building environment. Microbial-contaminated materials require special precautions prior to demolition to prevent biological dusts from dispersing in the occupied space. Another example of biological contamination is an accumulation of bird or rodent droppings. In both cases, uncontrolled disturbances could spread potentially allergenic or infectious dust to occupied building areas. It is therefore important to implement appropriate engineering controls and decontamination techniques to minimize all occupant exposure.

Volatile Organic Compounds (VOCs)

Some building materials release gases called VOCs. Common VOC sources include:

- Caulks, sealants, and coatings
- Adhesives
- Paints, varnishes and/or stains
- Wall coverings
- Cleaning agents
- Fuels and combustion products
- Carpeting
- Vinyl flooring

- Fabric materials & furnishings

Occupants with VOC exposure often report disagreeable odors, exacerbation of asthma, irritation to the eyes, nose and throat, headaches and drowsiness. Health symptoms associated with VOC exposure can be minimized by choosing low VOC emitting products.

What workers can do

When workers suspect their health problems are caused by construction and renovation exposures in their work areas, workers should:

- Report concerns immediately to supervisors or those persons responsible for building maintenance.
- See your doctor for proper diagnosis and treatment.

What management and building owners can do

When workers suspect their health problems are caused by exposures from construction in their work environment, owners and managers should:

- **Always respond when occupant health concerns are reported.**
- Establish clear procedures for recording and responding to IEQ complaints to ensure an adequate and timely response.
  - Log all complaints or problem reports.
  - Collect information about each complaint.
  - Ensure confidentiality.
  - Determine a plan for response.
  - Identify appropriate resources for response.
  - Apply remedial action.
  - Provide feedback to building occupants regarding the complaint and response actions.
  - Follow-up to ensure that remedial action has been effective.

Before and during construction or renovation, management and building owners should do the following:

- Identify all key personnel including representatives from the building and the general contractor who are responsible for addressing construction or renovation-related activities and airborne contaminant control. Other personnel such as building staff, engineers, and subcontractors, should be involved as necessary.
- Assure that construction/renovation workers are equipped with any necessary personal protection equipment such as N95 respirators (http://www.cdc.gov/niosh/npptl/respusers.html) , gloves, eye wear, head gear, and steel-toed boots.
- Develop a plan describing anticipated work activities and their location, associated source contaminants, and areas potentially affected.
- Schedule construction or renovation work during periods of low building occupancy or when occupants are not in the building.
- Isolate construction work areas from occupied areas using appropriate containment barriers.
- Negatively pressurize construction work areas and/or positively pressurize occupied areas to prevent migration of air contaminants from work areas to occupied areas.
- Dusts, fibers and contaminants can be released and carried to other areas in a building by heating, ventilating, and air-conditioning (HVAC) systems during construction and renovation activities if not properly contained. Consult HVAC professionals and engineers on how to modify HVAC operations to ensure isolation of construction work areas from occupied areas.
- Avoid storing construction materials and equipment in HVAC mechanical rooms.
- Maintain an adequate unoccupied buffer zone around the work areas to allow for construction or renovation traffic. If work is being done when occupants are still in the building, a buffer zone could require temporarily relocating occupants in the immediate vicinity of the work areas.

Resources

ASHRAE – Indoor Air Quality Guide - Best Practices for Design, Construction, and Commissioning (summary document) (https://www.ashrae.org/standards-research--technology/special--project-activities) (http://www.cdc.gov/Other/disclaimer.html)

Centers for Disease Control and Prevention – Construction Safety and Health (http://www.cdc.gov/niosh/topics/construction/)

The Environmental Law Institute (ELI) - *State-based laws and regulations* (http://www.eli.org/Buildings/iaq_databases.cfm) (http://www.cdc.gov/Other/disclaimer.html)

ELI - *Topics in School Environmental Health* (http://www.eli.org/buildings/tseh.cfm) (http://www.cdc.gov/Other/disclaimer.html)

Environmental Protection Agency (EPA) – A Guide for Building Owners and Facility Managers (http://www.epa.gov/iaq/largebldgs/baqtoc.html) (http://www.cdc.gov/Other/disclaimer.html)

EPA – Indoor Air Quality Design Tools for Schools (http://www.epa.gov/iaq/schools/dtfs.html) (http://www.cdc.gov/Other/disclaimer.html)

EPA – IAQ in Large and Commercial Buildings (http://www.epa.gov/iaq/largebldgs/) (http://www.cdc.gov/Other/disclaimer.html)

EPA – Mold Remediation in Schools and Commercial Buildings (http://www.epa.gov/mold/mold_remediation.html) (http://www.cdc.gov/Other/disclaimer.html)

New York City Department of Health and Mental Hygiene – Guidelines on Assessment and Remediation of Fungi in Indoor Environments (http://www.nyc.gov/html/doh/downloads/pdf/epi/epi-mold-guidelines.pdf) (http://www.cdc.gov/Other/disclaimer.html)

Occupational Safety and Health Administration – Construction Industry (http://www.osha.gov/doc/index.html) (http://www.cdc.gov/Other/disclaimer.html)

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