

Clear the air during roofing projects

Good indoor air quality should be maintained

Roof repairs and replacements are common in schools, especially schools with flat roofs that tend to crack, buckle, and spring leaks from exposure to sun, ice, snow, and wind. Roof repairs are vital to prevent water from entering school buildings and subsequent structural damage and mold growth.

Roof repair can, however, have a significant impact on indoor air quality (IAQ). The intense, unpleasant smell of roofing fumes will generate many complaints if the emissions are drawn into the building. Roofing fumes permeating a school are a health hazard to staff and students.

All roofing involves the use of toxic chemical-based materials. If old roofing material is being removed, there will also be the possibility of exposure to dust generated when disturbing old roofing materials. This dust may contain asbestos, which is an ingredient in many roofing materials.

Asphalt health hazards

Asphalt is a black, sticky, solid or semisolid substance that comes from crude oil. It is mixed with solvents to make it more liquid and easier to work with. Asphalt fumes and solvent vapors are released when asphalt is heated.

Some of the solvents used to mix with asphalt are naphtha, toluene, and xylene.

Breathing asphalt fumes is the most common route of exposure. Fumes contain very small, solid, airborne particles which are easily inhaled. The acute, immediate health effects of asphalt fumes include headache, skin rash, fatigue, eye and throat irritation, and cough.

Local associations can win effective controls

Working with their administrations, there is much that local associations can do to protect staff and students during roofing operations. Keep your NJEA UniServ rep informed of your progress.

Act quickly upon notification:

Act as soon as you know roofing may be performed. Public Employees Occupational Safety and Health (PEOSH) rules require school districts to give the building occupants at least 24 hours' notice before starting renovation work.

Insist that the district provide good communication to all affected parties:

Advance notification should be given to parents, students, and staff and proactive communication about precautions to be taken can prevent IAQ issues from developing and escalating.

Ask what roofing materials are being used:

There are many types of roofing systems and the chemical health hazards depend on what type is being applied. See "Types of roofing systems" in the sidebar for descriptions of common roofing systems.

Examine fact sheets on chemical hazards:

School districts must make *Material Safety Data Sheets (MSDS)* and *Hazardous Substance Fact Sheets (HSFS)* on roofing materials available to school employees. Knowing the health hazards will help the local association make the case that controls are needed to prevent exposure.

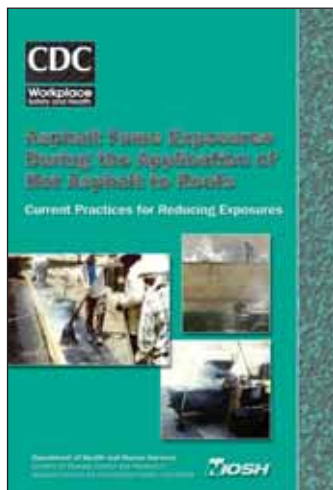
Request a less hazardous form of asphalt: There are many different types and grades of asphalt in current use. Some, such as low-fuming and low-solvent asphalts, are less hazardous than others. Ask the district to request that the contractor use a less hazardous form of asphalt in the school's roofing project.

Do not ask for air sampling:

Rather than attempting to measure levels of air contaminants which may be present in the school, it is more realistic to attempt to maintain an environment which is free of dust and odors.

Ask for these control measures

- ♦ **Perform roofing when the school is not occupied.** Ideally, roofing should be performed during the summer, on weekends, over holidays, or after-hours.
- ♦ **Identify and close off outdoor air intakes near roofing operations.** This should be done, even if the school is unoccupied, to ensure that fumes do not enter and linger inside after roofing activities cease. If the school is occupied, outdoor air from a non-contaminated area should be provided.
- ♦ **Control temperature of heating kettles.** Maintaining the lowest possible asphalt temperature in the asphalt kettles will reduce the amount of fumes generated.
- ♦ **Control location of heating kettles.** Kettles should be placed downwind and away from air-intake vents, doors, and windows. The inside of the lids should face away from the building so that fume emissions are released away from the building when the lid is open.
- ♦ **Wet asbestos before removal.** The school building's asbestos survey should be consulted to determine if asbestos-containing roofing materials (ACM) will be disturbed. If so, such materials need to be adequately wetted before removal, that is, penetrated with liquid to prevent the release of particulates. If dust is visible during ACM removal, then that material has not been adequately wetted.
- ♦ **Air out school prior to reoccupation.** If dust, fumes, or vapors have entered the school building, it should be cleaned and aired out as needed before reoccupation.



Types of roofing systems

The most common type of flat roof is Built-Up Roof (BUR) where multiple layers of asphalt-saturated organic felt or coated fiberglass or polyester felt are adhered with hot asphalt, coal tar pitch or adhesive. Other flat roofing methods include:

- ♦ **Modified bitumen:** Modified bitumen is heat welded, asphalt adhered, or installed with adhesive. Asphalt is mixed with polymers such as atactic polypropylene (APP) or styrene-butadiene-styrene (SBS), then applied to fiberglass and/or a polyester mat, and then the seams are sealed by locally melting the asphalt with heat, hot mopping of asphalt, or adhesive.
- ♦ **Thermosetting plastic:** An example of thermosetting plastic is ethylene propylene diene monomer (EPDM). Synthetic rubber sheets are adhered together with contact adhesive or tape.
- ♦ **Thermoplastic:** Examples of thermoplastic include polyvinyl chloride (PVC), thermoplastic polyolefin (TPO), and chlorosulfonated polyethylene (CSPE). Plastic sheets are welded together with hot air. If the thermoplastic is overheated, compounds such as hydrogen chloride and vinyl chloride gases may be produced.
- ♦ **Sprayed-in-Place Polyurethane Foam (SPUF):** Foam is sprayed in-place on the roof, then coated with a wide variety of coatings, or in some instances, covered with gravel.

Publications and websites for more information

Sample Renovation/Construction Project IAQ Compliance Checklist

www.state.nj.us/health/eoh/peoshweb/renovchecklist.pdf

Districts should be encouraged to begin completing this checklist at the planning phase of a renovation or construction project. Completing this checklist will also serve as documentation of compliance with some requirements of the PEOSH IAQ standard.

New Jersey Hazardous Substance Fact Sheets (HSFS)

web.doh.state.nj.us/rtkhsfs/indexfs.aspx

These have a user-friendly format and are available in English for more than 1,700 chemicals, including those possibly released during roofing. They are also available in Spanish for more than 600 chemicals.

New Jersey Hazardous Substance Fact Sheet on Asphalt

(CAS number 64762-93-4), April 2007

nj.gov/health/eoh/rtkweb/documents/fs/0170.pdf

Asphalt Fume Exposures During the Application of Hot Asphalt to Roofs, NIOSH Publication No. 2003-112, June 2003, www.cdc.gov/niosh/docs/2003-112/default.html. The document, pictured above, describes the application of hot asphalt to roofs, identifies steps in the process that may involve worker exposure to asphalt fumes, and identifies current engineering controls and work practices used to reduce exposures.