

Consumer Tips for Post-Disaster Home Restoration



Getting Back to a Healthy Home



U.S. Department of Housing and Urban Development
Office of Lead Hazard Control and Healthy Homes (OLHCHH)



After natural disasters, such as floods, hurricanes, tornadoes or other types of storms, your property may have hazards that could put your family's health at risk.

This publication helps homeowners identify hazards, work with contractors to remove the hazards, help ensure the work is done properly, and learn when they can return safely to the home. The publication discusses seven potential hazards that may impact your health. This publication is designed to be used only after the proper authorities have said it is safe to return to your home.

Please read the entire publication before proceeding with any actions. For more information, please visit www.hud.gov/healthyhomes.

Top 10 Tips

for Post-Disaster Home Restoration

- 1** Remind yourself often **to put people before property!** Make safety your top priority.
- 2** **Wear personal protective equipment (PPE)**, including protective clothing and a NIOSH approved respirator, **every** time you set foot in a damaged or moldy building.
- 3** **Assess** structural stability and hidden hazards before you enter. A professional inspection may be needed.
- 4** **Prepare a plan** (supplies and methods), **make a map** (disposal and clean-up site layout), and **review** insurance policies and disaster assistance resources.
- 5** **Go slow** when pumping out water, then **act fast** to dry out and remove mold. Copy and share the *DIY Mold Removal Guidelines* sheet with workers.
- 6** **Always remove wet insulation and foam padding**, even if the surface looks dry and clean.
- 7** **Assume lead-based paint and asbestos** is in homes built before 1978 (unless verified not present). Be mindful that disturbing such materials increases the hazard.
- 8** **Control dust, capture debris and contain contaminants** – with wet methods, drop cloths, debris bags, HEPA vacuums and workers trained in safe work practices.
- 9** **Check credentials** and hire only licensed and insured contractors, Lead-Safe Certified Renovators, certified Asbestos professionals, Mold Remediation Contractors, Fire and Water Damage Restorers, and other professionals, depending on types of work needed.
- 10** **Restore for More than Before!** Install hazard-resistant materials, connectors and building systems. Include energy-saving and **healthy home improvements**.

Potential Hazards: Health and Safety Concerns

The following are some of the potential hazards that could occur in a home following a disaster. Information on health and safety concerns associated with the hazards is also included.

MOLD



If your home has experienced flooding, wind-driven rain, plumbing failures or other water intrusion of any kind, your home will likely become impacted by mold. Molds are

living organisms that grow in damp areas, and there are many types that can grow almost anywhere, including walls, ceilings, carpets, and furniture. Humidity and prolonged wetness after a disaster create perfect conditions for mold to grow.

If you or someone in your family is sensitive to molds, they may experience symptoms such as nasal stuffiness, eye irritation, wheezing, or skin irritation. Serious allergies to molds could cause more severe reactions including fever and shortness of breath. If someone in your family has a compromised immune system due to illness, or has chronic lung disease, they may develop serious infections of the lungs when molds are present in the home.

ASBESTOS



High winds, floods and other storm conditions may damage components of your home, including those made with asbestos (a fire retardant). Depending on the

age of your home, pipe and duct insulation, vinyl flooring products (tiles, linoleum, vinyl sheeting), floor tile glue, exterior cement-like shingles, and other materials may contain asbestos. Asbestos fibers may travel easily through the air if a material containing asbestos has been damaged or disturbed. Exposure to asbestos can cause lung disease and lung cancer.

LEAD-BASED PAINT



Much like asbestos, major storms and floods can also cause deterioration of components in your home that contain lead-based paint. If your home was

built before 1978, lead-based paint may be present. Lead hazards, such as deteriorated lead-based paint or high levels of lead in dust or soil can be controlled with proper measures. Lead hazards are particularly dangerous to young children.

Potential Hazards: Health and Safety Concerns

(Continued)

WATER QUALITY



Disasters can impact public and private potable water systems in a variety of ways. Sewage from public systems, overflowing septic systems and contaminated wells

can be serious threats to resident health. Well water is particularly susceptible to contamination from disaster events. Water-related illnesses can develop if a water source is contaminated.

HOME SAFETY



In the re-occupancy or reconstruction phase of disaster recovery, damaged homes can present numerous hazards to you or your family. Structural

damage, unstable materials, chemical spills, vermin, gas leaks and electrical hazards may pose dangers in or around your home. There may be obvious hazards to resident health like downed power lines and debris in and around your home, as well as structural dangers like buckling roofs/walls/stairs. In addition, conditions within a home that has been flooded will likely require major cleaning prior to re-occupancy so that no toxic chemical or biological health hazards remain.

UTILITIES



Utilities that normally heat and power your home, including gas and electricity, may be unavailable for extended periods after a disaster. Temporary heating

and power sources (gas-powered electric generators or propane heaters) may give off carbon monoxide and should not be used indoors. Carbon monoxide is odorless, colorless and can cause sudden illness or in some cases death if the concentration is high enough. Electrical connections in formerly flooded spaces may pose shock or fire hazards when reconnected to the power.

RADON



Radon is a cancer-causing, radioactive gas that is caused by the natural break down of elements found in ground soil. Radon cannot be seen, smelled, or tasted but may be

a very serious problem in a home. Radon is the second leading cause of lung cancer in the United States. Testing is the only way to know if a home is affected by radon.

HIRING CONTRACTORS AND HOUSING RELATED PROFESSIONALS

To restore your home following a disaster so that it is safe for your family, you will likely need to employ one or more professionals. It is always important to make sure that major work is done by a qualified contractor/professional.

Ask the following questions to help identify qualified contractors/ professionals. If a contractor does not meet all of the requirements, you are advised to find another contractor/professional that does meet the requirements listed below.

For general contractors

- Is the general contractor licensed by the state?
- If your home was built before 1978 is the contractor certified with the State or EPA as a Renovation, Repair and Painting contractor?
- Are they insured for the type of work contemplated in your home? Does their general contractor's liability insurance cover special conditions, such as asbestos, other hazardous materials, lead paint, mold, etc.?
- Is the contractor familiar with meeting any new FEMA rebuilding requirements that might impact your property?
- Does the contractor have references that can be checked? Have you checked the references and found them favorable?

For specialized contracted work

For work such as **lead paint** abatement, **asbestos** repair/removal, **radon** abatement, or major **mold** remediation, it is important to check for the following:

- Is the lead abatement or asbestos firm licensed by the state? *(An identification document should be available.)*
- For major mold and radon remediation projects, is the firm certified by a third party that meets state licensing requirements such as the American Indoor Air Quality Council (AmIAQC) or the Institute of Inspection, Cleaning and Restoration Certification (IICRC)?
- Is the firm insured for the type of work to be conducted in your home? *(Be certain there is adequate insurance to protect against any liabilities that may arise during or as a result of construction as well as specific coverage for the environmental work, such as lead hazard control, mold remediation and asbestos remediation.)*

You should use caution when selecting a firm that indicates a building permit is 'not needed' for work after a disaster. Many different types of work that follow a major storm will require the permission of the local building department. If you are unsure about the qualifications of a firm, contact your local Division of Consumer Affairs or local building department for more guidance.

Planning the Work

Rebuilding projects after major or moderate storm damage can be complex and often frustrating. To get the job done properly, and ensure that your family returns to a safe home, this work may involve review and approval from environmental hazard inspectors (for lead-based paint, asbestos or mold), engineers, contractors, and local building officials. Here are some suggested tips or factors to consider when planning the work and hiring the rebuilding team:

1. SAFETY ONSITE FOR THE HOMEOWNER

Before entering the property, make sure that you have appropriate personal protective equipment (PPE). FEMA recommends having safety shoes or boots (*rubber boots may be best if you are not sure if the water has been pumped out*), work gloves, eye protection, rubber gloves for cleaning or when using sanitizing chemicals, a hard hat, and respiratory protection in case there is mold or bacteria contamination (*respirators with HEPA cartridges or dust masks with a rating of N-95 or higher should be used*).

When first entering the property, check it for any safety hazards including the following:

- ▶ Look for the symptoms of structural damage such as sagging ceilings, large wall or floor cracks, etc. If these conditions exist, you should contact a building inspector, engineer or licensed contractor for professional assistance.
- ▶ You should locate the electric and gas lines or propane supply to ensure they are not posing a danger for you or anyone accompanying you on your check. If you smell a natural gas leak, evacuate the home, and call the gas utility company immediately. If you are unsure about the condition of wiring or appliances, have them inspected by an electrician.
- ▶ If you use propane, inspect the tanks for any shifting and look for visible structural tank damage, including external appliance venting and vent caps. Also check for broken, bent

or otherwise damaged gas lines. Have any appliances/equipment that were damaged or exposed to water inspected by a licensed gas supplier or technician prior to use. Propane leaks smell like rotten eggs. If you smell a leak, evacuate the premises and contact your local fire department or propane supplier.

- ▶ You should call the power company if fallen power lines are observed. Never touch a fallen power line!
- ▶ You should not use any electrical outlet or appliance that has been flooded prior to inspection by an electrician.

Mold

If you are planning for mold remediation, this work involves many elements including moisture control, assessment of impacted materials, and containment of the mold-impacted areas from the other parts of the home. Again, mold can grow almost anywhere in wet areas of your home after disasters, including walls, carpets, and basements. When you remove mold, the primary concern is whether the water that created the mold has been removed (*i.e., flood water receded*) or repaired (*i.e., plumbing leaks fixed*). Mold remediation will not last if the moisture source is not stopped.

After the moisture has been controlled, you should assess the extent of the mold contamination. The Occupational Safety and Health Administration (OSHA) has issued guidance on how to address different sizes of mold removal projects such as:



- ▶ Small Areas of Mold Remediation (i.e., less than 30 square feet)
- ▶ Large Areas of Mold Remediation (i.e., 30 to 100 square feet)
- ▶ Extensive and Visible Mold Contamination

It is recommended that only small mold remediation jobs (*less than 30 square feet, or a smaller area if specified by state or local regulations*) be done by nonprofessionals and then only with the right personal protective equipment (*PPE*) such as respirators (*N-95 or higher*), goggles, long gloves and disposable coveralls. Major mold remediation jobs (*greater than 30 square feet*) should be performed by a qualified contractor to properly remove mold and prevent future growth.

For more information, go to [OSHA.gov](https://www.osha.gov) and search Mold Remediation.

Asbestos

If you are planning construction involving structural or cosmetic elements that contain asbestos, it is best to leave this work to the professionals. Materials containing asbestos cannot be identified just by looking at them. Some materials are labeled, but when in doubt, it is best to treat material suspected to contain asbestos, such as pipe wrapping, “popcorn” ceiling coatings, and 12-inch vinyl floor tiles, as if it does and have the materials inspected and tested by a certified contractor. If the materials are in good condition, and will not be disturbed by other construction, they should be left alone. If materials are damaged, there are usually two solutions: repair or remove, and both should be done only by an accredited asbestos contractor.

Lead-Based Paint

If your home was built before 1978 and paint is peeling, chipping or damaged in any way, it is best to test the paint for lead content or treat the paint as if it does contain lead. Lead-based paint inspections may only be done by a certified lead paint inspector or lead paint Risk assessor. Renovation work that may disturb lead-based paint, including paint that is already deteriorated may only be done by a Renovation, Repair and Painting (*RRP*) contractor certified by the EPA or the state. Lead-based paint abatement work may only be done by a certified Lead Abatement contractor.

Carbon Monoxide

Will your restoration involve temporary power or heat sources? If so, internal combustion equipment, like gas-fueled generators, will produce carbon monoxide. This equipment should always be operated outside and kept away from open windows or air intake openings. When temporary generators are used, carbon monoxide alarms should be used near bedrooms and installed according to manufacturer recommendations. Also, when restoring any heating or hot water system, all active chimneys and air vents should be assessed for leaks or blockages and repaired as necessary.

Radon

While natural disasters won’t change long-term radon risk, they can provide opportunities to install radon-resistant features. Installing a radon reduction system during rehabilitation or re-building, such as after a disaster, can make installation easier and less expensive.



Testing is the only way to identify a radon issue. Tests for radon can be found at home improvement stores and centers. Follow the directions on the packaging to properly place the device and send it in after the test period to get readings of radon levels. If a home has levels of radon 4pCi/L or higher, radon systems should be put in place. Lowering radon levels requires special knowledge and skills; qualified contractors to perform the work should be state certified radon contractors. See www.epa.gov/radon/radontest.html for information on finding certified radon professionals and state requirements, if any.

Water and Sewer Restoration

In most cases public water and sewer systems will be operable shortly after the disaster event and create few impacts on your home repairs. Check with your local water officials if you suspect that your public water sources are compromised in any way. Private well and septic systems, however, may suffer damage and if so they should be inspected by a professional. Restoring wells after a disaster should include water testing and inspection of all parts, with repair and disinfection as necessary.

Home Safety and Utilities

For most home safety and utility hazards, professionals may still be needed. Professionals for utilities differ from contractors or construction professionals and would not have the same accreditations or certifications. In any case, it is still a good idea to make sure that a professional has the proper training and experience to do the work needed. If an emergency comes up such as illness due to carbon monoxide or shock from power lines, always contact emergency services/911.

2. DURING CONSTRUCTION

After you have assessed the work to be done, completed any required inspection of hazardous conditions, selected a contractor and executed a contract, your home reconstruction then moves to the actual construction phase. Some items related to health to keep in mind during this phase include:

- ▶ Be sure all permits and approvals are obtained before construction begins.
- ▶ Agree with the contractor early about whether restoration work can be completed while your family remains in residence or if you will temporarily relocate. If you will be onsite during construction, be certain that work areas are properly contained for hazards and will not be accessed by anyone without proper training and personal protective equipment (*PPE*). There are specific requirements regarding lead abatement work or asbestos removal in an occupied property, including access to kitchen and bath facilities. Make sure that everyone knows the rules. While mold remediation and containment usually are not regulated, there are best practices for doing so that should be followed during the construction. Be sure you and your family know what hazards may exist during construction and be sure of the separation of work areas from living spaces.
- ▶ If the work involves lead paint or asbestos abatement, the contractor will need to complete that phase of the work and have a clearance test conducted by a certified lead clearance examiner, inspector or risk assessor, or by a certified asbestos contractor, respectively.



- ▶ If the work involves mold remediation, before wall cavities are closed up, a licensed/certified mold inspector or, if one is not available, you should look at the work that was done. Ask whether the contractor has properly tested for any remaining mold and the moisture content of components. There should be no visible signs of mold or moldy odors. It is recommended that a moisture meter be used on semi-porous structural materials, like wood, to determine moisture content. Materials with excessive moisture need to be dried prior to rebuilding or enclosure to prevent mold returning.

3. REUSING MATERIALS: TO SAVE OR REPLACE

When you are planning renovation, one of the first critical decisions is what you can save or repair and what has to be removed or replaced. When considering your options you should keep the health impact of your decision in mind. For example, will moldy material be able to be cleaned and treated so that mold will not come back? Usually materials that are soft and porous, like paper-faced gypsum board, will need to be replaced. Semi-porous materials like wood and concrete can usually be cleaned and treated. Non-porous materials should be dried and cleaned with a detergent solution or bleach and water (*1/2 cup liquid bleach to 1 gallon of water*).

When faced with replacing building elements like walls, floors and ceilings you should consider the possibility of future disaster events. If you are restoring a basement or first floor subject to flooding, you should consider moisture resistant building materials like fiberglass-faced gypsum board and spray foam or extruded polystyrene insulation rather than porous traditional drywall and fiberglass insulation. FEMA has issued guidance on building materials that are

appropriate for disaster-prone areas (*Flood Damage-Resistant Materials Requirements for Buildings Located in Special Flood Hazard Areas in accordance with the National Flood Insurance Program Technical Bulletin 2/August 2008*).

4. RETURNING TO THE PROPERTY (IS IT SAFE?)

After the major construction items have been completed how can you tell if the property is safe to be reoccupied?

Here are some important considerations:

- ▶ The contractor should have a complete inspection sign-off on the building permit and an occupancy certificate issued, if required. All of the required inspections (*building, electrical, mechanical, plumbing*) should indicate a final sign-off by the correct inspector.
- ▶ If regulated work was done, like lead paint abatement, asbestos removal, or major mold remediation, a clearance certification by the appropriate professional should be provided.
- ▶ Construction debris should no longer remain at the property. All contaminated construction materials that were targeted for removal, including anything containing asbestos, lead-based paint and mold, should have been properly wrapped, removed from the property and disposed of appropriately. Any hazardous waste should be disposed of in a designated hazardous waste facility.
- ▶ You should conduct a final walk-through of the property after construction and create a checklist of items that need to be completed. During this walk-through, check for any signs of mold that may be returning to areas that were rehabilitated, paint that may be deteriorating again, etc.

Post Natural Disaster Recovery and Rebuilding: Information Resources

Important information that may assist consumers, professionals, team leaders and volunteers is available on the following federal agency websites. Please check regularly for updates.

1. U.S. Department of Housing and Urban Development's Office of Lead Hazard Control and Healthy Homes (www.hud.gov/healthyhomes)

Please see the three videos:

Returning home after a natural disaster.



www.youtube.com/watch?v=aY4v6y2mcCo

This video discusses how to return to your home for the first time after a natural disaster. The video goes through a checklist of things to do and look for to ensure the safety of individuals and families.

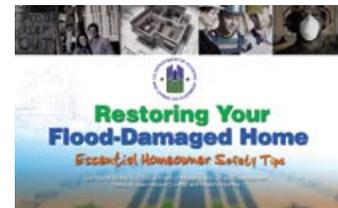
How to deal with mold after a natural disaster.



www.youtube.com/watch?v=IJvfbzg7gUA

This video builds on the first video and specifically talks about what a homeowner can do to address mold in their home.

Restoring your home after a natural disaster:



www.youtube.com/watch?v=nSJwDxi8f-E

This video covers potential hazards that could arise after a disaster, such as lead, mold, asbestos, CO₂, and other hazards, and how to address them as you rebuild.

2. U.S. Environmental Protection Agency (www.epa.gov/iaq)

3. Centers for Disease Control and Prevention. (www.cdc.gov)