

August 31, 2017

Drying of Historic Properties

Dear Friends and Colleagues,

After flooding disasters like Harvey, historic properties have some unique risks in addition to the direct damage from the water that property owners may not be aware of. In our case, loss of historic properties and materials is inevitable, but together we may be able to reduce the number of unnecessarily destroyed buildings and interiors, like we have witnessed following Hurricanes Katrina, Rita, Ike, Sandy, and others. I've outlined my thoughts below about issues specific to the drying of historic-properties in our climate following flooding.

Risks Related to Misinformation about Drying

People's misinformation about moisture sensitivity of materials and drying is a primary risk for historic buildings. Many historic materials, including interior lath and plaster or wood-paneled walls, particularly when uninsulated, are not as moisture-sensitive as sheetrock walls. Often, uninsulated interior lath and plaster walls can be allowed to dry, cleaned and painted. With modern gypsum wallboard (sheetrock), flooded walls should be removed to the wood framing and replaced along with wetted insulation. Property owners should be aware that many, seemingly authoritative personnel that they may encounter throughout the recovery process, while possibly well meaning, may not be basing their recommendations on accurate information.

- Inspectors (whether volunteer, official, contractor, or insurance), may not understand the difference in treatment required between modern, generally moisture-sensitive materials and older, more durable components. Because of this, many historic interiors have been gutted unnecessarily.
- Recovery Officials, possibly overwhelmed or misinformed, while often well-meaning, have recommended the demolition of properties that may be salvageable.
- Restoration contractors, often inexperienced or poorly informed, frequently rush one-size-fits all approaches to flood restoration that do not consider the actual quantity of damage or what is needed for repair.
- Developers. While not directly related to drying, in previous emergencies, developers have approached property owners with the intent of consolidating blocks for future development. However, there are reports of disingenuous facts regarding the condition of the

property or other pressure being used to attempt to influence property owners. Some of the properties sold and subsequently demolished were not particularly damaged and were not in need of demolition, resulting in possibly unnecessary loss of historic materials.

Initial Drying of the Building

It is important to begin the drying process as soon as possible. Damage will continue to progress while the building is wet.

- Don't wait for an adjuster or other inspector - they will likely be overwhelmed, and it may be a long time before the property is inspected.
- Get started drying now, to help reduce the formation of mold and the progression of other water-related damage.
- Review the referenced documents (at the end of this document) and safely identify and address potential electrical hazards and other safety concerns.
- If there's no power, open the windows and let the air flow through the building, until there is power restored.
- Take a lot of photographs. It can be important to document the condition of the house and everything that was damaged inside.
- If there's power, add dehumidifiers and air movers. In our humidity-prone climate, the outdoor air conditions may not provide effective drying. There will likely be an equipment shortage for dehumidifiers, if you cannot get this equipment, use fans to move air throughout the building.
- Get the building's mechanical air conditioning running. The air conditioning system provides drying when it is cooling.
- Remove the wet items from the building. Don't pile it into the garage.
- Leave cabinets in place (initially), but find a way to let the water out from behind them.
- Remove wetted gypsum drywall (sheetrock) about 12 inches above the water line.
- Remove wetted batt insulation.
- Do not demolish interior plaster (not sheetrock) or wood paneling and trim initially. They may be salvageable.

Building Materials Information

Different building materials have greatly varying sensitivity to moisture. This is an incomplete list, but some things to consider. Many historic materials do not need to be removed wholesale because of wetting. There may be other reasons to remove the materials (contamination, etc.), but the wetness itself may be able to be recovered from.

- Porous Materials Concrete, masonry, tile and plaster walls are less susceptible to damage from water inundation, but they can absorb a lot of moisture - which will need to dry out. This large amount of water in the materials can damage adjacent, more vulnerable materials if not allowed to dry. Often, these porous, but relatively insensitive materials do not need to be demolished or replaced.
- Gypsum Drywall (Sheetrock): Vulnerable to damage from water soaking. Should be removed if inundated. Further, these walls are usually insulated when installed on the perimeter of a building.
- Insulation: Batt insulation absorbs and retains water readily, and is very slow to dry. It should be removed and replaced if wetted.
- Wood Framing: Unfinished wood framing will absorb water readily, and will swell when wetted. This swelling can result in cracking of adjacent brittle finishes (like sheetrock), or nails backing out (nail-pops). Mold will grow on wood, especially if allowed to remain wet for long periods of time. Wood framing can be dried through walls, particularly if the moisture source is removed, there is active dehumidification inside the building, and the interior finish is permeable (like latex paint). Wetted framing may have trouble drying if the interiors are finished with vinyl, tile, or oil-based paints. Wood allowed to remain wet can rot and can grow mold on the surface. Limiting the time the wood remains wet is important to reducing the risk of deterioration.
- Wood Finishes and Millwork: Wood that is finished with hard, relatively impermeable coatings (like enamels, varnishes or polyurethanes) is less susceptible to moisture absorption than unfinished wood (like in framing). This type of finished wood is commonly installed on wall paneling, flooring, trim, cabinetry, and furniture. Older, maintained woods may have many layers of paints or other finishes. However, these areas are usually only coated on the surface of the wood that is finished (the backs and sides of individual wood pieces are often left unfinished allowing water absorption through those surfaces). When wood absorbs water, it will swell. This swelling can distort pieces and crack surfaces. Rapid drying of these type of materials should be avoided, as this can also cause blisters, cracks or other ruptures of the surfaces. This happens as moisture from the interior of the material tries to quickly push through the coated surface, and as materials quickly and unevenly dry. If possible, these types of materials should be allowed to dry more slowly to reduce the risk of surface/finish damage.
- Wood Flooring - Wood flooring also has a hard finish. Flooring is often installed with a small air gap over concrete, or a wood sub-floor that is also susceptible to swelling and movement from wetting. The hard finishes resist rapid drying, and swelling often causes cupping of the individual pieces. This cupping improves with drying, but often leaves some permanent deformation that may be able to be repaired. Removal of the water below the floor is essential, but this may require removal of areas of flooring to access and dry the area below.

Note on Rapid Drying

Beware of the accelerated drying rates that can be achieved with mechanical equipment, as this can cause damage to wood and plaster surfaces. First responders often try to dry as rapidly as their equipment allows. If there are wood finishes, be aware that this rapid drying can result in rupture of finishes, paint blisters, and other

problems as water attempts to push through less permeable surface treatments (enamels, polyurethanes). However, the need for primary water extraction from walls, floors, and framing may be more important than the need to mitigate damage to fine wood finishes, which may already be damaged from initial swelling. Both of these needs should be weighed as drying commences, and the recovery practices may vary depending on the importance of the interior finishes.

Some references available for the flood recovery of historic resources recommend ventilation to avoid additional damage caused by rapid mechanical drying; however, because the ambient humidity frequently occurring in Houston may result in insufficient drying to reduce the rate of damage, we recommend the use of slow, controlled, mechanical drying if possible.

Inform Property Owners

We should disseminate concise, quality information as effectively as possible. Property owners will make decisions based upon the information available - let's help them have the most accurate information. This includes a basic understanding of material sensitivity to be able to better direct contractors, inspectors, and insurance representatives and reduce unnecessary destruction.

Additional Resources

This is not intended to be an exhaustive guide to flood restoration and does not address the numerous potential hazards associated with flood recovery. For an overall approach to the flood damage, there are numerous resources, including several that I identified that were currently available on-line at the time of this writing:

FEMA 2013. "Cleaning Flooded Buildings, Hurricane Sandy Recovery Fact Sheet No. 1," Web site: [LINK](#), accessed August 31, 2017.

U.S. National Park Service, Preservation Assistance Division, 2010. "After the Flood: Emergency Stabilization and Conservation Measures," Web site: <http://cool.conservation-us.org/byorg/nps/npsafter.html>, accessed August 31, 2017.

American Red Cross, "Repairing Your Flooded Home," Web Site: https://www.redcross.org/images/MEDIA_CustomProductCatalog/m4540081_repairingFloodedHome.pdf, accessed August 31, 2017

Please contact me directly at 713.869.0000 should you desire additional information regarding the above or if we can be of other service.

Sincerely yours,


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Principal