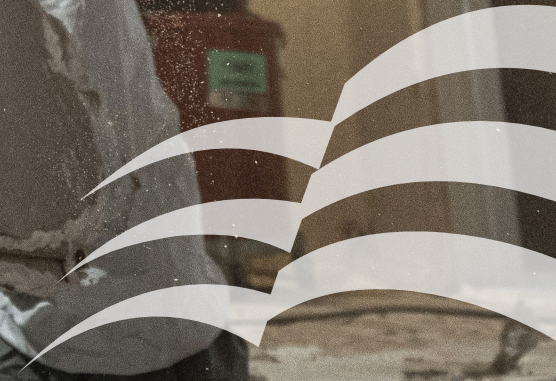




# WATER DAMAGE: ISSUES AND RESTORATION



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## Introduction

Water damage can cost a company or building owner millions of dollars, depending on the nature of the structure involved and issues that result from it. The business interruptions that result from water damage can be even more costly than repairing the damage.

Burst pipes, overflowing septic systems and toilets, leaking appliances, and leaking roofs tend to be the most common sources of water damage. However, water damage does not just have to be man-made; it can also stem from major events, such as hurricanes and floods. The line between man-made and natural damage can be blurred as one source can spiral into more damage from other sources, especially if a fix is avoided for too long.

This white paper offers key background and actionable steps facility owners can take to identify the root causes of water damage, develop prevention measures and plans, and understand options for restoration services.



# Man-Made Causes of Water Damage

## DOMESTIC PLUMBING LEAKAGE AND CORROSION

Domestic plumbing is a primary culprit of water damage. Leaking or burst pipes caused by improper installation and maintenance and corrosion are among the most common causes of damage.

The advancement rate of corrosion depends on water pH, oxygen levels, chemistry, temperature, and the velocity of water running through the pipe. Galvanic corrosion, the most common type of corrosion, occurs when two dissimilar metals (such as copper and steel tubing) are connected together in the presence of an electrolyte.

Potable water is a weak electrolyte. The long-term effects of potable water running throughout domestic plumbing cause galvanic corrosion to slowly build up to destructive levels, if left unresolved.

## HOW PIPING CONTRIBUTES TO WATER DAMAGE

Industry chatter often claims that old pipe is higher quality than new pipe. But is this true?

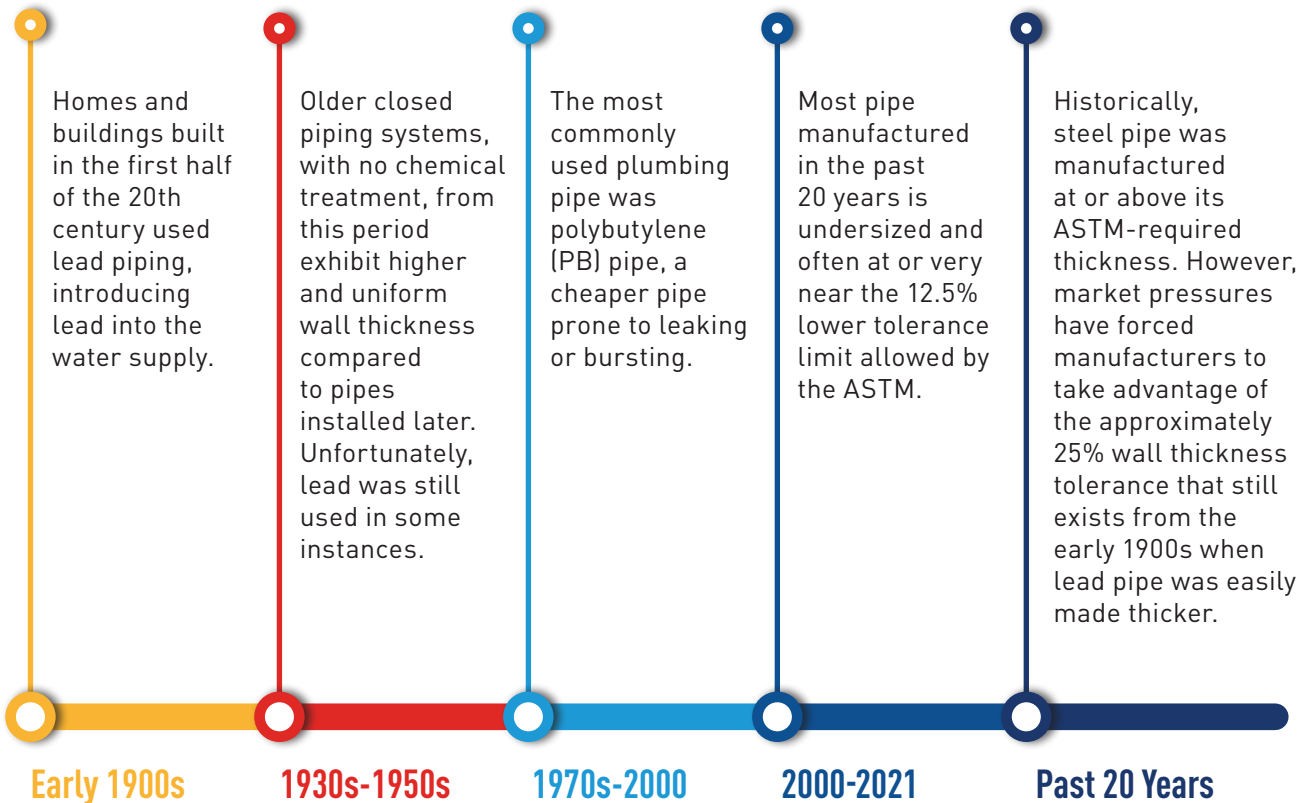
Contrary to popular belief, the age of a building's pipes is not the major factor in most pipe failures. In fact, older building piping systems tend to be of higher quality. Failure to prevent and control corrosion tends to be the primary root cause.

Older closed piping systems from the 1950s and earlier, with no history of chemical treatment, still exhibit high and uniform wall thickness near new pipe, meeting American Society for Testing and Materials (ASTM) factory specifications. This is in stark contrast to the aggressive corrosion trends being identified in newer pipes. Unfortunately, corrosion is typically internal and is not easily diagnosed until defects create leaks and cause damage.

Before its downsides were discovered and researched, lead played a large role in higher-quality piping systems. While lead pipes were less susceptible to corrosion and their ability to bond was superior, lead is one of the most poisonous substances historically used in buildings.



## HISTORY OF PIPING



Copper pipe is considered superior to its counterparts. It is strong, bonds well, and is ideal for hot water but not cold water, where PVC is commonly used. Copper pipe is also expensive, making it a sought-after commodity and often the catalyst behind jobsite break-ins.

## PLUMBING ISSUES

Plumbing problems tend to be hard to detect because pipes and hoses are usually hidden inside walls.

### LEAKS

250 gallons of water can leak from 1/8" pipe crack in one day.

### TOILET OVERFLOWS

Clogs in drain lines and main sewer lines can prevent waste from flowing away from the building and cause the toilet to overflow. This type of overflow is known as "black water."

### HEATING, VENTILATION, AND AIR CONDITIONING (HVAC) UNITS

Air conditioners must be serviced regularly. A lack of maintenance can cause moisture accumulation, resulting in leaks. Dampness serves as a breeding ground for mold and mildew.

### CLOGGED GUTTERS

Gutters do not drain properly if they are blocked by debris. When this happens, water flows over the gutter's edges and down the sides of home or building facades, seeping in through the foundation, windows, and doors.

### WORN OR FAULTY APPLIANCES

Hot water tanks and washing machines are the two most common appliances that cause water damage, though other appliances, like refrigerators and dishwashers, are also susceptible to deterioration and leaks. Most often, these appliances fail because of weakened hoses and cracked pipes.

- **Failed Washing Machine Supply Hoses**

The average age of failed washing machine supply hoses in the US is 8.7 years.

- **Water Heaters**

75% of water heaters fail before they are 12 years old. The average age of a failed water heater is 10.7 years.



## SEPTIC BACKUPS

Sometimes septic and sewer systems cannot handle usage volumes due to heavy rains or storms. Main septic lines can also have issues that prevent them from carrying wastewater away.

Either situation can cause backup into a building through floor drains, toilets, and sinks. Immediate action is necessary to address these problems to reduce the likelihood of health hazards.




**Over 90% of natural disasters in the last decade were related to water.**

Source: United Nations

## Natural Causes of Water Damage

When natural disasters strike, they often manifest through water. Floods, hurricanes, landslides, tsunamis, storms, and blizzards are becoming more frequent and more intense.

An aerial photograph showing a residential area that has been severely flooded. The water is a murky green color and has surrounded several houses and trees. Some houses have roofs visible above the water. In the foreground, a small boat with people is on the water. The background shows more trees and houses, all partially submerged.

**By 2050, rising populations in areas prone to floods, climate change, deforestation, loss of wetlands, and rising sea levels are expected to increase the number of people vulnerable to flood disasters to 10 percent of the world's population.**

Source: UNESCO

# Basic Prevention: Mitigation Plan

Most organizations identify the natural disasters their facilities are most prone to and create a mitigation plan to address those risks if a disaster occurs. Mitigation plans help businesses navigate disasters and reduce business disruptions in the event of a natural disaster.

Businesses should take steps now to improve their resilience and prepare for potential damage with regular facility upkeep and a thorough mitigation plan. The time it takes to build your plan now is an investment worth making, as it can help you save in the long term by mitigating costly damages.

Here are the key elements to include in your plan.

## PERSONNEL

Before implementing the mitigation plan, facility personnel should obtain the support of senior management, who must share and promote the plan among their team members. Then personnel should take these steps:

- Set up organizational, employee, and contractor charts to track all personnel.
- Identify and prioritize timelines for notifying key personnel of a potential event, such as risk management, engineering, maintenance, security, facilities, etc.
- Authorize and train key employees annually on shutting down and isolating systems in an emergency.
- Assign an accountable coordinator to be in charge of the water damage response program. Write action items (such as training needs) into the annual performance goals of the water damage coordinator.
- Update and revise the mitigation plan at least once a year to stay responsive to the facility's needs.



## SPILL CONTROL KITS

Spill control kits are valuable for not only chemical spills but also water spills or leaks that could damage your property. These kits should include the following:

- **Personal Protective Equipment:** Gloves, respiratory protection, goggles, full-body suits, etc.
- **Absorbents:** Socks to be used as dams in doorways or other openings, smaller pads to soak mild spills, and large absorbent pillows to soak up larger spills.
- **Clean-Up Materials:** Bags and ties for disposing of used absorbents, scoops, pans, etc.

## EQUIPMENT

To prevent excessive damage from natural disasters, a facility's equipment should be running at optimal performance. To achieve the best facility preparation, a company should take these steps:

- Schedule formal inspections for older piping systems, water heaters, plumbing hoses, HVAC, and other systems.
- Install leak detection and/or automatic shutdown devices for susceptible equipment, such as HVAC systems, piping, areas where mechanical, electrical, and plumbing was roughed in, sprinkler systems, vents, etc.
- Affix identification tags on critical valves that indicate what portion of the system they control.
- Review sprinkler valve closing procedures during emergencies with your local fire department. Typically, only the fire department should shut down a fire sprinkler valve upon response to a fire emergency, as fires could reignite.



## BE READY

In addition to prepping personnel and equipment, a company should take these steps:

- Put together emergency supply spill control kits equipped with materials to mitigate damage from escaped liquids.
- Prepare a document outlining any extraordinary measures that need to be taken to prepare for extreme weather and weather-related damage, like intense cold, hurricanes, microbursts, and flooding.

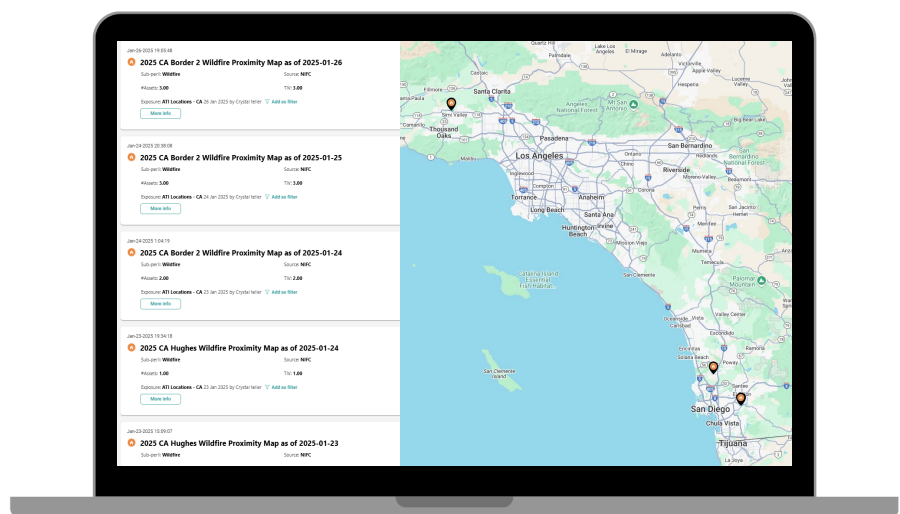
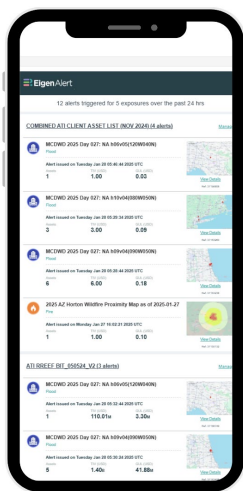
**In 2024, floods and droughts displaced more than 40 million people and caused economic losses of more than \$550 billion.**

Source: Wired

## DISASTER PREPAREDNESS AND TECHNOLOGY

Companies should leverage technology to prepare for a disaster by storing all important information and disaster recovery solutions in the cloud using a safe and secure application.

Many software platforms can help you create and maintain a comprehensive contingency plan, accelerating the speed and efficiency of recovery efforts should disaster strike. These platforms can help you assess the damage to your business, establish a plan, and train your team members to execute action items immediately with a detailed roadmap.



# Basic Prevention Steps: Inspections and Maintenance

Even buildings with good quality water, plumbing, and maintenance can experience leaks. That's why it's so important to have a water damage mitigation plan that includes inspection steps to help prevent excessive damage.

Have your building regularly inspected by professionals to ensure your systems are at peak performance. Follow all maintenance recommendations given by your inspector. Be sure to also consider the benefits of the latest technology-enabled water detection technologies.

## MECHANICAL, ELECTRICAL, AND PLUMBING INSPECTIONS AND MAINTENANCE

Commercial plumbers, electricians, and mechanical experts should inspect your facility. They can work with you to develop a regular inspection program based on your building. Their inspections should pair with regular maintenance, including the following:

- **Plumbing Inspection Programs:** Implement formal inspection programs on plumbing systems to identify visible corrosion and consider replacing old piping systems.
- **Plumbing Hose Inspections:** Inspect plumbing hoses on toilets, sinks, laundry machines, and kitchen appliances. Replace them every five years and consider installing water detection systems in these areas.
- **Boiler Room Checks:** Pay attention to boiler rooms, making sure boilers, chillers, valves, pumps, and joints are in good shape. Keep floor drains clear in these areas. Consider installing water detection systems and door sills for containment.
- **HVAC Inspections:** Check HVAC units to ensure drain lines are clear and add water detection sensors to them (if not already preinstalled).



Keep fire sprinkler systems in good shape. Repair damaged or corroded sprinklers and pipes, ensure inspections meet NFPA 25 standards, and train staff on valve locations and emergency response.

Local fire departments will inspect and test sprinkler systems yearly and provide annual maintenance reports. They can also give you a checklist of what to look for in advance of their inspection.

## ROOF INSPECTIONS AND MAINTENANCE



### Roof Inspections

Ensure the roof is regularly inspected, roof drains are clear, and repair roof damage. Commercial roofers and general building inspectors can perform these inspections annually or as needed for your building.



### Gutter Inspections

Roofers can also inspect your gutters for proper drainage. They can recommend repairs and clear any blockages.



### Vacant Spaces

Make sure heat is adequate, shut off water where not needed, and drain unnecessary systems. Maintain heat for water-based sprinkler systems.



### Sewer and Wastewater Systems

Prevent sewer and wastewater system backups with regular maintenance to ensure they are not blocked or clogged.



### Water Storage Tank Inspections

Ensure water storage tanks won't fail by providing regular internal and external inspections.



# Restoration and Repairs

When water damage strikes, quick action is essential to prevent further destruction and ensure a successful recovery. Professional techniques such as water extraction, thermal imaging, and mold remediation play a crucial role in minimizing damage, protecting health, and restoring your property to its original condition. This guide outlines the key steps and strategies involved in effective water damage restoration.

## WATER EXTRACTION

Extraction removes the majority of water from the property. By performing thorough water extraction, drying time is reduced, which helps to prevent mold and secondary water damage. Powerful pumps and truck-mounted vacuum units are used to quickly and efficiently remove thousands of gallons of water from properties.

Highly trained technicians begin the extraction process almost immediately. Depending on the amount of water, they may use powerful submersible pumps in addition to industrial-strength wet/dry vacuums.

Carpets and carpet pads should also be inspected to determine whether removal is needed to protect the subfloor. All carpets and pads should be thoroughly dried to prevent mold or bacterial growth, which could cause sickness and, in extreme cases, death.



## THERMAL IMAGING

Thermal imaging is crucial in understanding where building walls and envelopes may be compromised. This type of building scan goes beyond areas of hot and cold temperatures. It can indicate where water may be pooling, dripping, or leaking.

## WATER MAPPING

In tandem with water extraction, water mapping is a vital aspect to initiate immediately. Moisture detectors, hygrometers, and other tools measure the extent of moisture saturation, which should be analyzed to optimize drying strategies. Professionals should also use thermal imaging to find water hiding behind walls, ceilings, and floors.



## DEHUMIDIFICATION AND DRYING

After extraction, much of the moisture in the walls, floors, and surrounding areas remains. Most building materials, like drywall and wood, are porous and will retain a significant amount of water. The retained water will cause these materials to warp, swell, break down, and/or cause mold growth and damage.

Professionals can manipulate temperature and relative humidity to remove the remaining moisture. Specialized equipment, including industrial air movers and dehumidifiers, accelerates moisture evaporation in building materials and other hard-to-access areas.

Facilities should also use moisture monitoring equipment until the areas return to acceptable levels. Depending on the amount of water, achieving these levels may take hours, days, or weeks.

## MOLD REMEDIATION

Where there is moisture, there is strong potential for mold growth. Molds—black mold in particular—can cause a myriad of health problems and property damage if left unchecked. If you detect a mold problem, act quickly. Mold damages the materials on which it grows. So, the longer it grows, the more damage it can cause.

## DOCUMENT DRYING

Freeze-drying, air-drying, desiccant dehumidifying, and even hand-dry cleaning techniques are implemented to restore important documents, photos, business records, models, and collectible items.

## CONTENTS CLEANING AND RESTORATION

After extensive water damage, large areas of a property and the contents within it will likely need professional cleaning and treatment. For example, flooding and water damage often require odor removal and deodorization treatments due to the unpleasant odor of wet materials.

Industrial air scrubbers and fogging equipment can treat and eliminate offensive, persistent odors that typical air fresheners and treatments cannot. Professionals may also need to use antimicrobial, antibacterial, and/or disinfectant treatments to sanitize badly damaged areas.

## Conclusion

Returning a home or business to its pre-water damage condition is a restorer's ultimate goal. When a property has been damaged by water, the immediate concern may include temporary protective measures to prevent additional damage, such as placing roof tarps, boarding up doors and windows, installing temporary fencing, and packing up items and moving them out. Restoration may involve minor repairs, such as drywall or flooring replacements, or major repairs, such as the reconstruction of various areas or rooms.

The restoration process can be simplified by having one trusted, qualified company to handle mitigating the initial damage and rebuilding the affected property. Working with a single company can save you time and keep your costs low.

An emergency response agreement (ERA) can support your facility's disaster recovery and mitigation plans. An ERA establishes a relationship with a restoration service provider, ensuring priority response from qualified experts at predetermined rates. ERAs allow companies to delegate disaster recovery efforts to local boots on the ground, meaning a quicker reaction time and better chances of recovering their assets.

To learn more about the benefits of an ERA with ATI, [contact us today](#).





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