WATER DAMAGE: ISSUES AND RESTORATION

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TABLE OF CONTENTS

Introduction

Water damage can cost a company or building owner millions of dollars, depending on the building involved and specific issues that result from it. Burst pipes, overflowing septic systems and toilets, leaking appliances, and roof leaks tend to be the most common sources, but even more costly are the business interruptions.

Water damage falls into two categories: natural and man-made. The line between the two can be blurred or crossed as one source can spiral into more damages from other sources, especially if a fix is avoided for too long. The information covered in this white paper will provide the knowledge and tools to identify root causes, develop prevention measures and plans, and understand the restoration services.

For more information on water damage and how it impacts your building's insurance policy, check out our paper

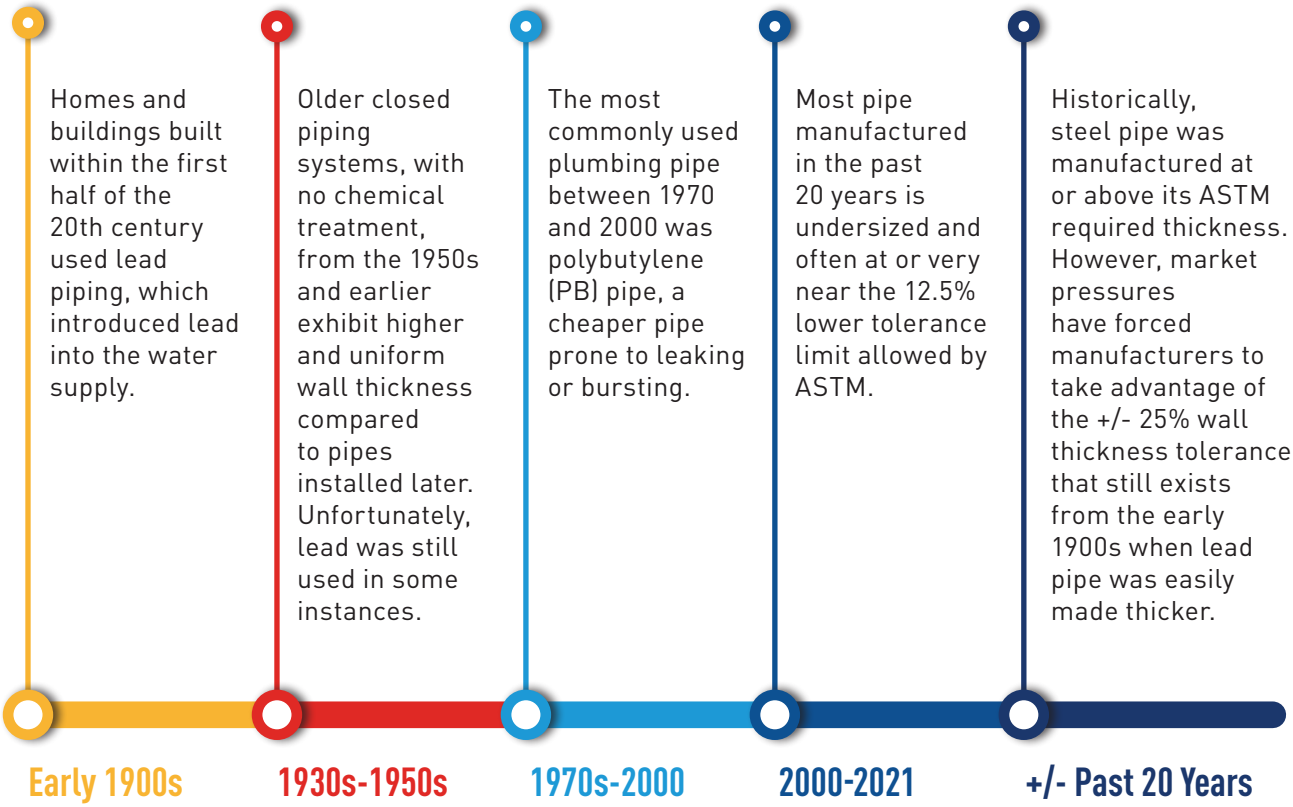
WATER DAMAGE AND INSURANCE IMPLICATIONS

Root Causes - Man-Made

DOMESTIC PLUMBING LEAKAGE AND CORROSION

Domestic plumbing is a primary culprit of water damage. Leaking pipes caused by improper installation or maintenance, corrosion, and burst pipes are among the most common reasons for damages. Contrary to popular belief, the age of a building's pipes is not the top factor in most pipe failures. In fact, older building piping systems tend to be higher quality. Failure to prevent and control corrosion tends to be the primary root cause. Unfortunately, the most typical corrosion is internal and is not easily diagnosed until the defects create leaks and cause damages.

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, 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, and the long-term effects of it running throughout domestic plumbing causes this galvanic corrosion to slowly build up to destructive levels if gone unresolved.



PIPE'S CONTRIBUTION TO ISSUES

Industry chatter often claims old pipe is higher quality than new pipe. But is this true? While some factors–like tactile strength and durability–make these accurate, older pipes have their fair share of flaws. The science behind pipes seems to be an evolving process. 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. Before its downsides were discovered and researched, lead played a large role in the 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 building.

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 the hardest to detect because pipes and hoses are usually hidden within the walls.

LEAKS

250 gallons of water can leak from ⅛" 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 and lack of maintenance can cause moisture accumulation, resulting in leaks. Dampness also serves as a breeding ground for mold and mildew.

CLOGGED GUTTERS

Gutters do not drain properly if they have blockage from debris. When this happens, water flows over the gutters' edges and down the sides of the home or building facades, causing damage by 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 due to weakened hoses and cracked pipes. Although other appliances, like refrigerators and dishwashers, are also susceptible to deterioration and leaks.

- **Failed washing machine supply hoses**
  Average age of failed washing machine supply hoses (U.S.) 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 (U.S.).

SEPTIC BACKUPS

Sometimes septic and sewer systems cannot handle usage volumes due to heavy rains or storms. Main lines can also have issues that prevent them from carrying wastewater away. In either case, it can cause backup into a building through floor drains, toilets, and sinks. This is a very serious situation that should be handled by to reduce the likelihood of health hazards.

Root Causes - Nature-Made Water Damage

When natural disasters strike, they often manifest through water. Floods, hurricanes, landslides, tsunamis, storms, blizzards, heat waves, cold spells, droughts, and waterborne disease outbreaks are becoming more frequent and more intense. The impacts and costs of these events are exacerbated by unplanned urbanization and degradation of ecosystem services. Innovative and readily available water and sanitation services are important in keeping any potential risks low.

Facts and Figures

Around **74%** of all natural disasters between 2001 and 2018 were water-related.

In 2020, floods and droughts affected over three billion people and caused total economic damage of almost **$700 billion.**

*UN WWDR, 2020

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 disaster to **2 billion.**

*UNESCO, 2012

Basic Prevention - Mitigation Plan

Most organizations identify natural disasters their facilities are most prone to and create a plan should those disasters occur. This plan, called a Mitigation Plan, helps a business navigate disasters and mitigate business disruptions in the event of a natural disaster. There is increased pressure on businesses to improve their resilience to potential damages with regular facility upkeep and well-written Mitigation Plans.

PERSONNEL

To successfully mitigate business disruptions in the event of a natural disaster, a company's personnel should:

- Ensure senior management believes in and actively promotes the importance of the plan.
- Highlight organizational, employee, and contractor notification charts.
- Identify and prioritize timelines for notifying key personnel, such as risk management, engineering, maintenance, security, facilities, etc.
- Authorize and train key employees annually on shutting down and isolating systems in an emergency event.
- 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 individual buildings' needs.

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:

- 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, and areas where mechanical, electrical, and plumbing (MEP) was roughed in, sprinkler systems, vents, etc.
- Affix identification tags on critical valves, indicating what portion of the system they control.
- Review sprinkler valve closing procedures during emergency events 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:

- 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 damages, like intense cold, hurricanes, micro-bursts, and flooding.

Spill Control Kits

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

PPE

Gloves, respiratory protection, goggles, full-body suits, etc.

ABSORBENTS

These products vary. They can include 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

This can include bags and ties for disposing used absorbents, scoops, pans, etc.

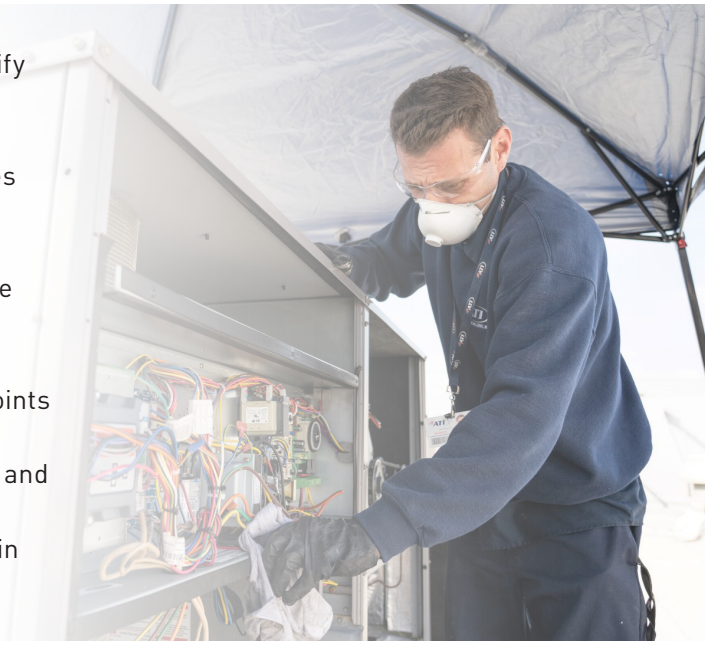
Basic Prevention - Inspections & Maintenance

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 to help prevent excessive damage. It is also important to consider the benefits of the latest IoT-enabled water detection technologies. Inspections are the best form of prevention. Have your building regularly inspected by professionals to ensure your systems are at peak performance. Follow all maintenance recommendations given by your inspector.

MEP INSPECTIONS AND MAINTENANCE

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

- 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).



Local fire departments will inspect sprinkler systems and provide inspection, testing, and maintenance (ITM) reports for the year. They can also give you a checklist of what to look for in advance of their inspection. 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.

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 blockages and proper drainage. They can recommend repairs and clean any blockages.
- Vacant Spaces Need Attention: Make sure heat is adequate, shut off water where not needed, and drain unnecessary systems. Maintain heat for water-based sprinkler systems.
- Sewer & Waste Water 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

Extraction removes the majority of water from the property. By performing thorough water extraction, ATI helps reduce drying time, which helps to prevent mold and secondary water damage. We use powerful pumps and truck-mounted vacuum units to quickly and efficiently remove thousands of gallons of water from properties.

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 processes 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 are inspected to determine if removal to protect the subfloor is needed. This also aids in removing any water that could cause 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. This tool is imperative in supporting many.

WATER MAPPING

In tandem with water extraction, water mapping is a vital aspect of the "immediate action" process. Moisture detectors, hygrometers, and other tools measure the extent of moisture saturation. Thermal imaging may be used to find "hidden" water behind walls, ceilings, and floors.

DEHUMIDIFICATION AND DRYING

After extraction, much of the moisture in the walls, floors, and surrounding areas remain. 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, are used to accelerate moisture evaporation in building materials and other hard-to-access areas. Monitoring equipment is also used until the areas return to the acceptable levels within drying goals. Depending on the amount of water, this may take hours, days, or weeks.

MOLD REMEDIATION

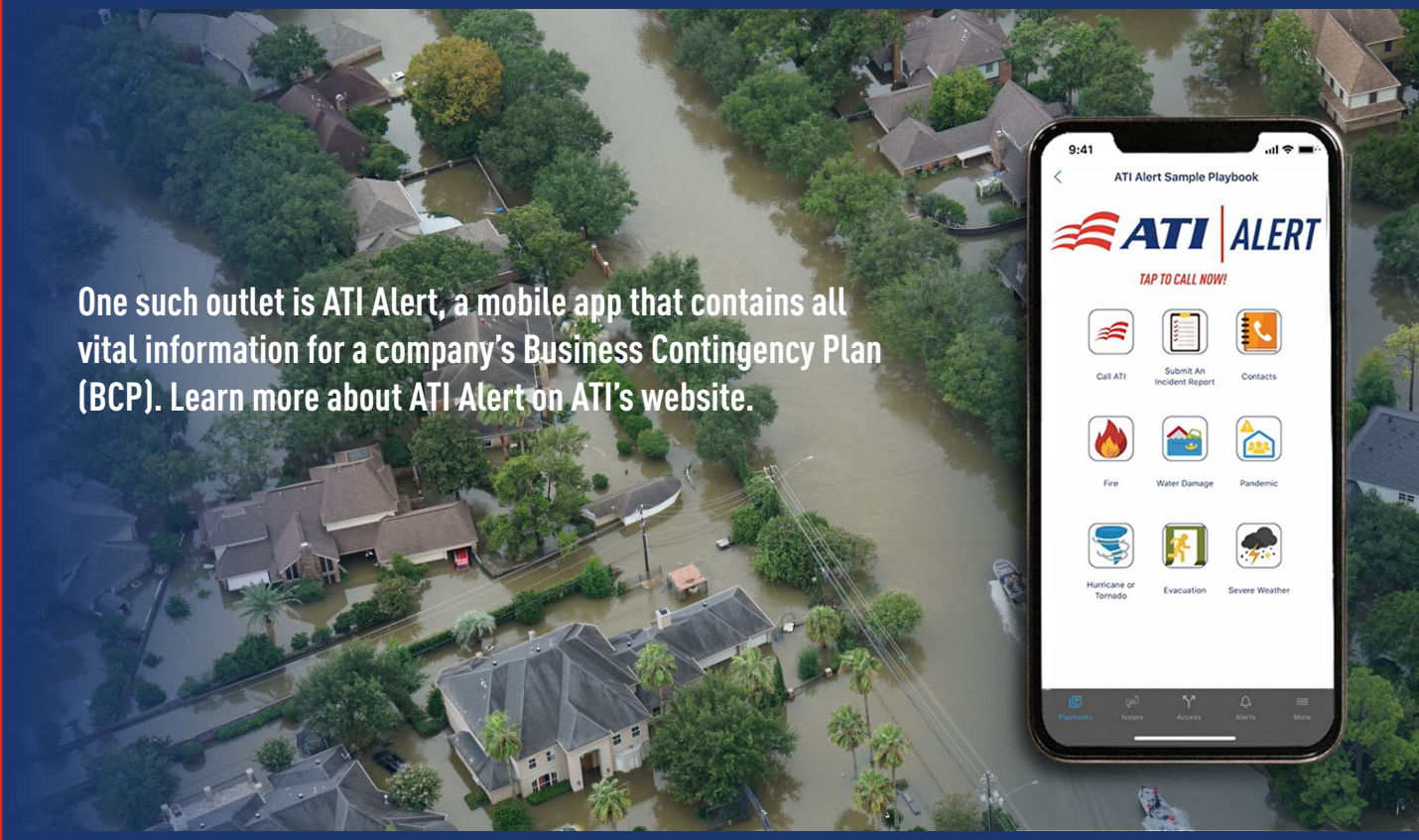
Where there is moisture, there is strong potential for mold growth. Molds – black mold in particular – can cause a myriad of health problems and property damages if left unchecked. For more detailed information regarding black mold and other molds, see our paper labeled “Black Mold.”

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.

DISASTER PREPAREDNESS ASSESSMENT AND TRAINING

Companies should leverage technology to prepare for a disaster by storing all important information and disaster recovery solutions into the cloud using a safe and secure application. Many platforms can help you create and maintain a comprehensive contingency plan, impacting your speed and efficiency of recovery efforts should disaster strike. These platforms can help a company assess its business, establish a plan, and train team members to execute action items immediately with a detailed roadmap.



One such outlet is ATI Alert, a mobile app that contains all vital information for a company's Business Contingency Plan (BCP). Learn more about ATI Alert on ATI's website.

CONTINGENCY PLANNING THROUGH ERAS

To support disaster recovery and mitigation plans, companies should establish Emergency Response Actions (ERA). In putting a 24-hour emergency response in place at all of your properties, catastrophes and other emergencies are handled immediately by qualified experts at predetermined rates. ERA's allow large companies with multiple properties to delegate disaster recovery efforts to local boots on the ground, meaning a quicker reaction time to recovering a companies assets.

CONTENTS CLEANING AND RESTORATION

After extensive water damage, large areas of a property will likely need professional cleaning and treatment. Proper cleaning helps you save money while making every effort to preserve your assets. Flooding and water damage often require odor removal and deodorization treatments due to the unpleasant odor of wet materials. The elimination of offensive odors can be performed with industrial air scrubbers and fogging equipment, treating serious and persistent odors that typical air fresheners and treatments cannot. Depending on the scenario, a property may require the usage of antimicrobial, antibacterial, and/or disinfectant treatments to sanitize badly damaged areas.

Bringing a home or business to its pre-water damage condition is the ultimate goal of restoration. This may involve minor repairs such as drywall or flooring replacements, or major repairs, such as the reconstruction of various areas or rooms. When a property has been damaged by water, the immediate concern may include temporary protective measures to prevent additional damages: roof tarps; boarding-up; temporary fencing; move-/pack-out. The restoration process can be simplified by handling both the initial damage mitigation and rebuilding the affected property. Having one trusted, qualified company for the entire process can save time and keep costs low.

Case Study - What Happened in Texas?

ATI'S RESPONSE

In the middle of February 2021, the unforeseen hit Texas communities. Severe winter weather swept through the state, cutting off power and heat to millions of homes and businesses that were not prepared. The deep freeze produced heavy damage to buildings and homes in the form of burst pipes, valves, and tanks. Even after electricity was restored to many areas, residents were left with no source of running water and homes that were devastated by water damage. As of February 21, 8.6 million people were still being asked to boil their drinking water, and about 120,000 others had no water at all as plumbers and water utilities battled an epidemic of leaky, broken pipes.

The demand for plumbers and restoration crews to clean up water damage, repair pipes, and allow Texans access to their residences and running water skyrocketed. In the matter of one week–from February 14 to 21–the Fort Worth area reported a confirmed 611, and counting, water main breaks. The winter storm is estimated to cost upward of $20 billion, the costliest in state history, according to the Insurance Council of Texas.

ATI sent over 3500 pieces of equipment and over 150 personnel to Dallas and Houston within 3 weeks. These employees served as temporary workers and subcontractors focused on mitigation work, but mitigation and temporary repairs have transitioned into hundreds of construction jobs in the region. Equipment to support this ballooning effort was procured through a combination of borrowing from other ATI offices across the country, the company's preloaded CAT trailers, purchasing new equipment, and renting more equipment; including dehumidifiers, air movers/circulators, and HEPA vacuums and filters.

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