

## Insight: Water Intrusion



### Recognizing the Risk

Water intrusion and liquid damage is one of the leading causes of loss across all industries. While occupancies such as healthcare, hotels, and offices have a high occurrence of water intrusion losses, all occupancies are susceptible to water damage, subsequent mold growth and related impacts.

Preventing these losses and taking quick and effective action when leaks first occur can help to drastically reduce the number and size of losses. Reducing the likelihood of such incidents also minimizes the disruption to operations and critical human resources.

### Controlling the Hazard

- Water damage originates from several sources:
- Domestic water lines and symptoms
- Drains and drain lines
- Sewage systems
- Cooling and heating systems
- Sprinkler piping
- Flooding
- Ice dams at roof eaves
- Laboratories
- Toilets

Older piping systems are more prone to failure. These systems require greater maintenance and testing to assure the integrity of the pipe, fittings and equipment. Some public or private water supplies contain certain minerals that increase the corrosion rate of water. Proper water treatment, system maintenance and testing the integrity of systems must be practiced in such areas.

Pipe breaks often occur during earthquakes. Facilities in earthquake-prone areas should be prepared for leaks and breaks and assure that piping components are adequately sway-braced. Refer to NFPA 13 Standard for the Installation of Sprinkler Systems or the International Plumbing Code for proper installation of sway-bracing. When leaks do occur, immediate action is vital to preventing further damage and assuring a faster return to normal services.

Sewer backup can cause water intrusion through floor drains or other sewer piping. The cause of the sewer backup could be located a long distance from the facility but could still create a significant loss.

Water intrusion can also occur from flooding or surface water breaching the building envelope, especially at door and window openings, vents, waste/exhaust and other penetrations. Even a small construction defect or design flaw could allow water to easily enter a building. Close attention should be given to landscaping (slope and drainage around a building) so that these site features don't act like a funnel for the water to enter the building.

In some parts of the world damaging ice can develop at the roof eaves due to poor insulation or ventilation, which can expand the exterior wall system. Once the ice begins to melt the water can enter the building along the exterior wall. If the ice melt coincides with heavy rain events, the water intrusion could be significant.

### Related Loss Statistics

Over the past several years the number of water damage losses has increased as well as the total associated financial loss.

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During a four-year time period from 2014 to 2017 there were approximately 3,788 claims in the US reported to AIG. Approximately 34% of these claims were associated with water damage not related to a natural peril. Fire and Natural Perils claims were the next leading cause of loss with 29% and 17% of the claims respectively (Figure 2)

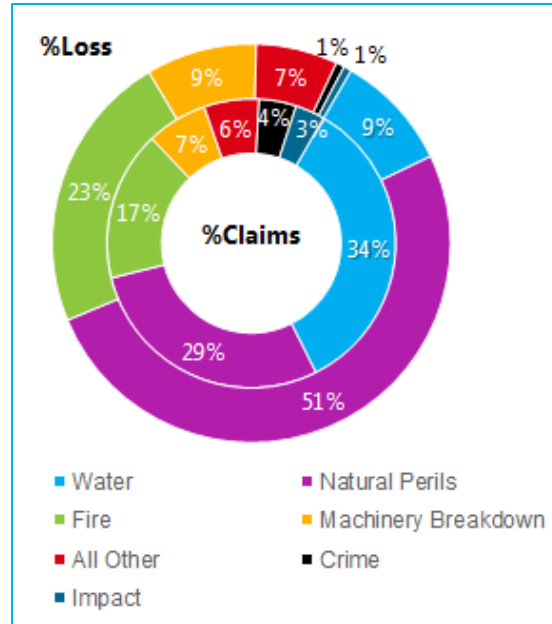


Figure 1 - Claim Volume and Loss Distribution by Main Cause

Water damage losses can be divided into various categories. Each category is shown below in the pie chart (Figure 3). Based on the financial losses associated with water damage, burst or leaking pipes was the leading cause for loss with 42% of the claims and 45% of the dollars lost. Frozen pipes and sprinkler discharges were next with 18% and 13% of the losses respectively.

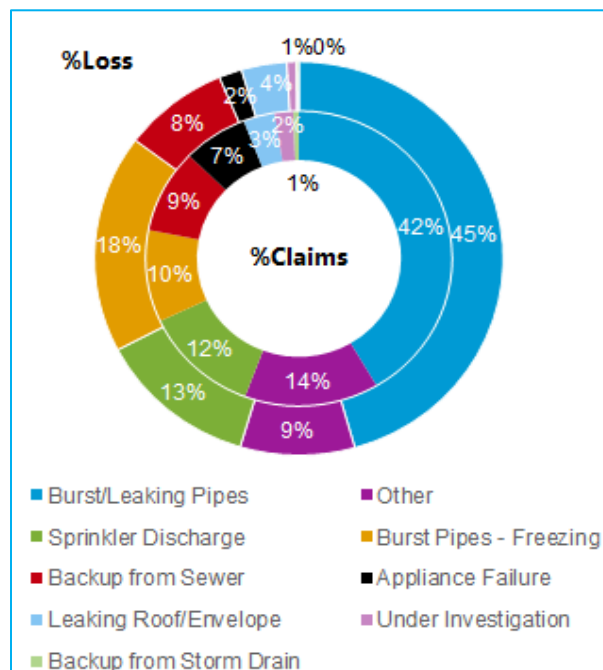


Figure 2 - Category of Water Damage Losses

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When looking across the top 4 occupancies by water damage loss (Figure 4 and 5) it is seen that Burst/Leaking Pipes is the major cause of loss except for Hotels where 59% of the water losses originate from Sprinkler Discharge

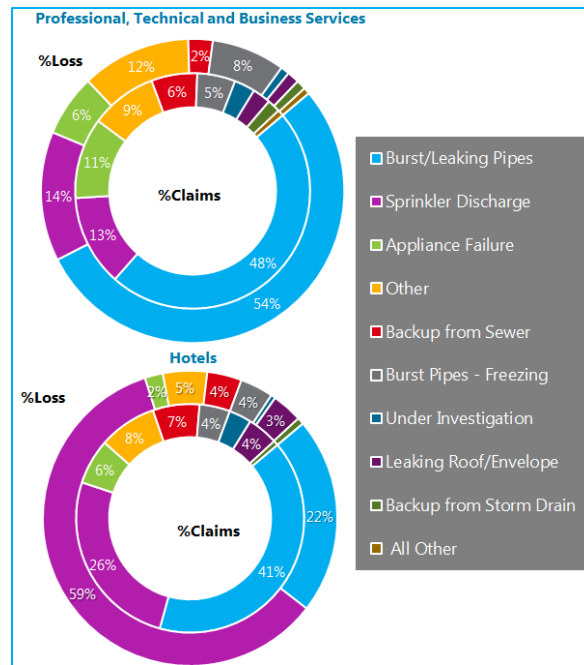


Figure 3 - Water Damage Losses in Business Services and Hotels

Burst Pipe–Freezing is comparatively more dominate for permanent dwelling and Health Care Services accounting for 20% and 18% of the total losses

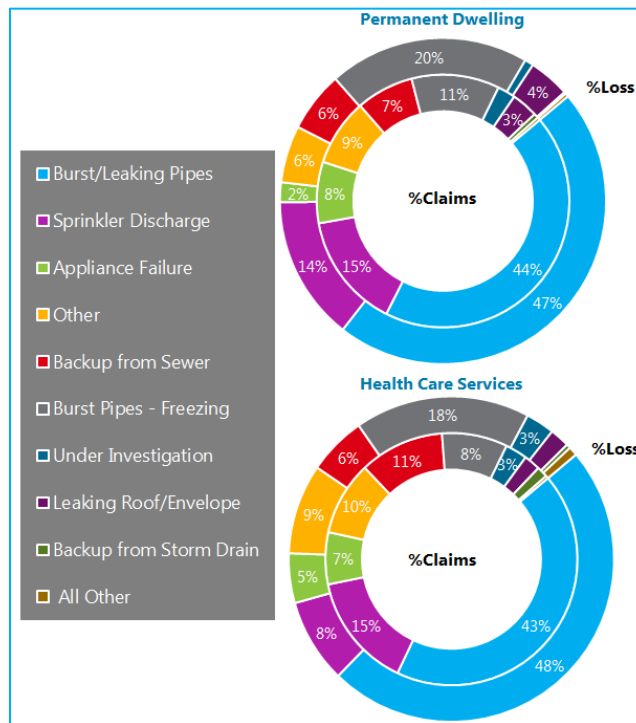


Figure 4 - Water Damage Losses in Dwellings and Health Care Services

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Therefore, when it comes to water damage losses the focus of loss prevention planning can be on piping systems, but all potential water sources should be considered when developing a fully integrated Liquid Damage Prevention Plan.



Figure 5

### Recommendations - General

AIG recommends that all locations have a detailed Liquid Damage Prevention Plan in place that provides information regarding potential water intrusion events. The plan should incorporate the unique features and operations of the facility, and should address the following:

- Potential sources of liquid damage
- Routes of entry
- Managing change – facilities or operations
- Mitigation efforts in place
- Vulnerability assessments
- History of leaks/water damage
- Remediation resources available
- Valve shutoff authority

The plan should include procedures for both a clean water incident and a contaminated water incident. A clean water intrusion would be from a direct release from domestic broken water pipes, tank, and bath or sink overflows and rainwater. A contaminated water incident would be associated with the release of sewage or where there are biological or chemical pollutants within the liquid.

The Liquid Damage Prevention Plan should be reviewed annually to ensure that all potential incidents are addressed and to review any changes in the facility or equipment that could introduce a new loss potential. In addition, the review should include changes in personnel that could affect the implementation of the plan.

Having as much detail in the Liquid Damage Prevention Plan as possible will help reduce the decision-making time and allow for an effective response during a water intrusion event. In most water damage events, the steps taken in the first hour of the start of the event make a big difference in the total outcome of the loss.

Water remediation vendors should be identified ahead of time and a sound working relationship should be maintained so that these vendors can be called in on a moment's notice.

## Recommendations - Piping

Detailed plans or schematic of the various piping systems should be retained at the facility maintained and made readily available for reference to key managers and maintenance personnel. As a best practice all piping systems should be labeled with the type of liquid being transferred and direction of the flow. Ideally the labels should be color coded for easy recognition in the event of an emergency. It is recommended that the color coding follow the ANSI A13.1 (Figure 7).

Pipe Contents	Color Scheme
Fire-quenching fluids	White text on red
Toxic and corrosive fluids	Black text on orange
Flammable fluids	Black text on yellow
Combustible fluids	White text on brown
Potable, cooling, boiler feed, and other water	White text on green
Compressed air	White text on blue
User-defined	White text on purple
User-defined	Black text on white
User-defined	White text on grey
User-defined	White text on black

Figure 6 – ANSI Piping Color Coding Chart

Control valves for all liquid handling systems should be identified and labeled. The locations should be clearly known by the Liquid Damage Prevention Plan Team Members.

## Water Intrusion Sensor Detection Systems

There have been significant improvements in water sensor technology over the last few years. Most of these technologies now have wireless capability and sensors are easily installed in areas where it was previous difficult or impossible to install detectors.

The sensors are not just capable of detecting water but can be arranged to shut off control valves if desired. Most vendors also provide monitoring services that allow the customer to receive alert messages to computers, tablets or smart phones.

These systems can also be used to monitor water use, identify waste, and provide robust analytics to improve water management and operating costs.

## References & Resources

NFPA 13 Standard for Installation of Sprinkler Systems

International Plumbing Code

The National Institutes of Health - Moisture and Mold Remediation is also a good resource for information in developing a Liquid Damage Prevention Plan.

\*While NFPA documents are the global standard used by AIG, international equivalents may be acceptable.

For more information, contact your local AIG Risk Engineer.

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