PROPERTY RISK CONTROL: COLD WEATHER AND BROKEN WATER PIPES

Extremely cold weather can cause water pipes to freeze. Sprinkler systems, where the water is not moving, are especially susceptible to freezing. A broken water pipe can lead to significant property damage. Organizations that do not have daily occupancy or someone routinely checking on all properties have the potential for a leak to go undetected for long periods of time.

A common way to prevent freeze-ups and the resultant potential for water damage is to maintain adequate building heat in all areas where a water-filled system is present. This can be achieved through:

- Pre-season preparations
- Periodic cold weather inspections
- Special action plans when cold waves (or polar vortexes) are predicted
- Special precautions for extended idle periods
- Response plans for low building temperature conditions

When water-filled systems freeze, the formation of ice can result in obstructions, impaired water flow and malfunction of systems. A freeze-up is usually first identified by a loss of water pressure or flow. For fire protection systems, the freeze-up may represent a hidden threat that is not immediately apparent. Since water expands when it freezes, if it occurs within piping systems, it can eventually lead to broken pipes, valves and fittings.

Adequate Heat

The best way to prevent freeze-ups is to maintain adequate building heat. Ice will form at 0 C (32 F). The building temperature will obviously not be adequate if it is at or below this freezing threshold. National Fire Protection Association (NFPA) codes and standards use 4 C (40 F) as the threshold for an adequate building temperature. When temperatures drop below this point inside the building, actions should be initiated to identify and correct the cause.

Challenges of monitoring buildings for low temperature include:

- Normal building occupancy – Some organizations don't operate around the clock
- Security patrols – There is not always an on-site security force available around the clock
- Electronic monitoring - If the building is unoccupied and the alarms do not sound at a central agency, problems may not be identified until it is too late.

Staff/volunteer occupancy is a simple and reliable approach to monitor a building during normal business hours. There may still be some unoccupied areas/structures that might require a special effort to monitor and assure adequate temperatures.

There is no substitute for human presence, but some organizations don't provide staffing at all times. As a result, continuous monitoring of building temperature is a challenge. This reinforces the importance of taking appropriate actions to prepare for cold weather, periodically conducting cold weather inspections and having a special action plan when extreme cold weather is expected. Consider these risk control measures:

Pre-Season Preparations

- Heating and sprinkler systems – Provide annual service
- Air-handling units – Verify dampers work and fans are controlled by thermostat for automatic shutdown in the event of freezing temperatures
- Water-based fire protection systems – Check antifreeze solution
- Dry pipe systems – Check to assure low point drains do not have water present
- Insulating systems protecting water-filled pipes – Verify coverings are intact
- Building insulation – Verify windows and doors are functional, weather tight and in good repair
- Fire alarm systems – Check building low temperature and sprinkler system air pressure supervisory devices in accordance with NFPA 25 and NFPA 72

Once these preparations are completed, it is important to correct any noted deficiencies before cold weather arrives.

Periodic Cold Weather Inspections

Once cold weather arrives, begin periodic inspections (at least daily). Preparing and using a form can help guide these inspections. Consider the following areas:

- Building windows, doors and walls are closed and weather tight
- Building temperature in each area is appropriate, including those with a greater exposure to freezing
- Heaters are working
- Insulation on water-filled pipes are intact

Special Action Plans When Cold Waves (or polar vortexes) Are Predicted

When extreme cold temperatures are in the forecast for the area, understand that these unusually frigid conditions could overwhelm building heating systems and insulation. Take time to implement a special action plan before the cold wave arrives. Actions to consider include:

- Conducting a more frequent cold weather inspection
- Safely increasing building heat to all areas
- Overriding energy saving set-back thermostats or building management programs that may automatically reduce building temperatures during the cold wave.

Special Precautions For Extended Idle Periods

When extended idle periods are planned during cold weather, recognize that the interruption of normal human presence during a long weekend or holiday period increases the potential that a freeze-up may go undetected. Consider the following:

- Periodic cold weather inspections
- Monitoring weather forecasts, specifically cold waves
- Availability of knowledgeable personnel to check on the property and promptly respond to abnormal conditions

Summary

It is important to develop and implement written procedures for pre-winter weather inspections, cold weather monitoring of all properties and the appropriate actions to take when abnormal conditions are identified during an inspection. Whether it is a broken window, a heater failure or low building temperature conditions, prompt action is needed. For each condition listed on the cold weather inspection form, identify potential actions that may be appropriate. This may include a contractor contact list to expedite requests for broken windows, heater repairs, glazing repairs or sprinkler system service.

Reducing the chance of freeze-ups, broken pipes and the resulting property damage depends upon maintaining adequate building heat in all areas where water-filled systems are present.

REFERENCES

- NFPA 25, Standard for the Inspection, Testing, and Maintenance of Water-Based Fire Protection Systems. Quincy, MA; NFPA, 2011.
- NFPA 72, National Fire Alarm and Signaling Code. Quincy, MA; NFPA, 2010.