

Preventing Water Damage to Electrical Equipment

Introduction

Electrical equipment may be damaged by water in many ways such as floods, storms, overflows, burst pipes and discharge of fire suppression devices. When exposed to or submerged in water, electrical equipment can suffer corrosion, deformation, or contamination by impurities contained in the water. All damage may not be apparent at the time electrical devices are exposed to water. Exposure to water may cause filler material in fuses to be compromised causing the insulation and interruption capabilities to be reduced. Circuit breakers may be impaired by corrosion. The ability of wiring to conduct electricity may be degraded.

Electrical Equipment At Risk

Examples of some of the electrical components at a typical facility that may be at risk of damage by water include:

- Motors - whether large or small driving pumps, elevators, heating ventilation and air conditioning equipment, or process equipment.
- Elevators - electrical cables, switches and controls. The trailing cables and switches located in elevator pits are particularly susceptible to damage.
- Transformers - main electrical feed transformers, or various smaller units located throughout a facility.
- Generators - such as emergency stand by units.
- Appliances - which include washers, ranges, or dryers.
- Heating ventilation and air conditioning (HVAC) equipment - includes various switches and controls.
- Electrical distribution equipment – including cables, wiring, switches, controls, breakers, fuses, and motor control centers.

Sources Of Water

- Leaking roofs or other parts of the exterior building envelope.
- Hot water tanks - leakage from the shell of the tank, discharge of safety valves, or leakage from associated valves and fittings.
- Hot water or steam heating systems - leakage of boiler shells, associated valves and piping, or safety valves.
- Air conditioning systems - leakage of evaporator drains, or chilled water piping and associated valves and fittings.
- Water piping - leakage from potable water piping or sprinkler piping, and associated valves., as well as drains and related piping.
- Floods - the rising of natural bodies of water.
- Appliances - leakage from such appliances as washers or icemakers.
- Fire protection equipment - leakage from sprinklers or hose stations.

Contamination Control Methods

Water damage prevention can be quite easy to implement. There are many methods which one can employ to decrease the risk of having equipment damaged by water from various sources:

- Prompt repair of damaged roofs or of the exterior building envelope by professionals.
- Regular inspection of hot water tanks and other vessels that contain water for corrosion of the shell and leakage at any valves or fittings. Install dyking around any large vessels to contain any water leakage.
- Have hot water or steam heating and air conditioning systems maintained by professionals who inspect the systems for leakage and proper functioning on a regular basis.

- Ensure that all water piping is protected from damage by freezing or impact.
- Assess the likelihood of any flooding from natural bodies of water in the area of the facility.
- Maintain all appliances in good order to reduce the risk of water escape.
- Keep all drains free from clogs and install back flow valves where necessary to prevent drains from backing up.
- Install sump pumps and drains in the proximity of equipment that is at risk of being contaminated.

Water Leak Detection Systems

To help keep an eye on potential trouble spots the installation of a water leak detection system is advised. These leak detection systems can be either passive or active. Passive leak detection systems are intended to alert you of a possible water leak by sounding an audible alarm. These systems are frequently battery-operated inexpensive units that are easy to install. Active leak detection systems usually generate some type of alarm, but also perform a function that will stop the flow of water or start a pump to remove water that has leaked.

Risk Assessment

Most modern facilities operate some form of electrical equipment that is exposed to water contamination. In order to evaluate the exposure the following is recommended:

1. Complete an audit of all electrical equipment within the facility which should include collecting the following information:
 - Type of equipment – electrical wire chasses, electrical panels, or motors etc.
 - Location of the equipment – proximity to water sources.
 - Location of sump pumps and redundancies.
 - Location of natural water sources.
 - Dyking installations – around larger hot water tanks or filters.
2. Evaluate the risk of water contamination to each piece of electrical equipment separately.
3. Take appropriate measures to reduce the risk of water contamination to equipment from sources as they are discovered.

Summary

Most people believe that water damage only occurs after several days of rain results in flooding. Electrical equipment can be damaged by water on a hot sunny day due to the failure of a water tank, piping, or an appliance. It is important to assess the risk of water damage to electrical equipment from various sources and then take steps to reduce the risk before an incident occurs.

Key Action Steps

- Identify electrical equipment at risk.
- Evaluate sources of water that could contaminate equipment.
- Implement a contamination control method.

Additional Information

- www.nema.org
- www.ibhs.org
- local electrical services authority