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Water Infiltration—Causes & Solutions

By Howard McKew, P.E., C.P.E.

I was told several years ago that the first thing a facility manager does is make sure the building is tight, starting with the roof. Next comes the basement to be water-tight, followed by the exterior walls. As many probably know from their homeowner experience, once water enters a building, "bad things happen"! Stained ceiling and walls, damp floors, and the beginning of mold forming on surfaces, creating a biohazard to the occupants. Other water leak dilemmas can be flooding, building deterioration, and long-term problems, e.g., odors.

First line of defense: a tight roof, proper flashing, roof penetrations, e.g., plumbing vents using rubber roof boots, and buildings butted together flashed properly.

Without these protective measures, the following can occur:

- Aging roof materials fail, requiring a new roof. Replacement roofs options are:

  A second layer of shingles per many State Codes, although not recommended depending on the installing roof contractor's warranty. A new roof should have a life of 20-25 years. Some roof shingle manufacturers may tout their shingles have a 30-year warranty but that is just for the roof material and not the installation workmanship.

  A second option may be a metal roof with a 50+ year guarantee. These types of roofs can be installed over an existing shingled roof, but they too can have leaks at the joint seams based on the workmanship.

  A flat roof replacement will require a rubber roof and will also have an approximate 50-year useful service life. Rubber roof leaks can be relatively easy to patch. There are a variety of rubber roof types and applications. Please refer to Focus on Facilities,

Preventive Maintenance of Roofs and Roofs-New & Replacement Options, February 2022.

- Roof leaks from deteriorating flashing sealant will require new sealant applied, if not new flashing. For existing rubber roofs, a patch can be applied by an experienced roofer.

- Roof leaks from pipe penetrations will require a new replacement roof boot installed per manufacturer's recommendations.

- Ice build-up on roofs can be the result of heated interior air reaching the attic space, resulting in snow melting on the roof ridge and eventually backing up under the roof shingles. Another problem source can be gutters, installed along the roof ridge, that are filled with leaves and debris preventing water from draining properly off the roof. With water collecting in the gutter and

freezing, ice can migrate under the roof system resulting in roof leaks into the building. Gutters should be cleaned prior to the winter. Also, additional attic insulation, as well as ventilation of the attic can help avoid roof ridge ice backup.

The plywood base under the roof material can eventually deteriorate from water infiltrating via failed flashing and/or ice buildup at roof ridges. With all roof problems, the building owner should seek the advice of a roof consultant for an unbiased opinion or solicit repair or replacement proposals from two or three qualified roofing contractors. The Diocese Facilities Services maintains a list of pre-qualified roofing contractors.

Wet basements can be the result of inadequate moisture protection around the exterior perimeter masonry wall when the building was constructed. In some areas, an additional underground drainage system should be installed to prevent water from seeping into the basement from the floor and/or perimeter walls below grade. Usually installed during construction, if not done and water infiltration becomes a problem, removing the soil around the facility perimeter may be needed to eliminate the water problem in the basement.

If the water infiltration is via a crack in the basement masonry wall or basement floor, due to the structure settling over time, there are qualified contractors that can repair/seal the crack(s) and many offer up to a 10-year guarantee on their work. Another basement wall penetration can be a sewer pipe exiting, city water pipe, utility gas pipe, and/or electrical conduit penetrating the wall below grade where water seepage may occur over time. In this case, a water-tight sealant should be able to resolve the problem.

An alternative to water infiltration prevention may be to install a sump pump and receiver into the basement floor and direct the discharge pump piping directly to outdoors. Similar to having adequate attic ventilation to address moisture build up and possible mold occurring, basements require adequate ventilation too, as well as consideration to install a dehumidifier to control a wet environment.

Exterior water leaks will usually occur when windows, louvers, vent caps, or doors to outside are not installed properly. Each should have adequate flashing per the equipment manufacturer prior to the exterior siding being installed. In these wet situations, the siding will need to be removed, flashing installed or replaced and then the exterior siding reinstalled.

Whenever and wherever a water leak occurs, it is important to note that water spreads rapidly and absorbs into floors, walls, ceilings, and other "soft material." Wet material will stain the surface, breakdown the material, and often mold will begin to form requiring interior repairs and material replacement, as well as mold abatement.

In summary, be proactive by drafting an annual survey checklist for the building to avoid or minimize potential damage due to water infiltration. Refer to Focus on Facilities, Annual Building Maintenance Checklist, October, 2020.

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