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## **What are the keys to protecting a building from water damage? - by Dennis Kulesza**

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Keeping a building watertight is critical to the preservation of any structure. Water can be, after all, the single most damaging element to a building.

In many cases, facility managers are faced with water problems that plague a structure from initial construction. As time goes on, these problems become even more severe.

The importance of a maintenance plan – regularly scheduled roof and wall inspections  
Water first damages a building cosmetically, then structurally. And by the time water damage is visible on the interior of a building, it is likely that some irreversible damage has been caused to the exterior. Once irreversible damage to the building exterior has occurred, costly retrofit/reinstallation work is required. Over time, the only way to prevent water from entering a structure is through a regularly scheduled maintenance program that incorporates visual inspections by skilled professionals.

Roofs should be routinely inspected in the spring and fall. Inspecting a roof in the fall will allow for one to ready it for the winter. Fall is a good time to check drains and gutters to see that they are free of debris. Clearing debris from drains is a simple task during mild weather, but it becomes difficult, if not impossible, once temperatures drop below freezing.

Inspecting a roof in the spring helps identify damage caused to it over the winter. Making repairs before spring rains prevents water from causing permanent damage to the roof. cursory inspections should also be done after windstorms and after any work is done to the roof or rooftop equipment.

Walls are typically more durable than roofs and usually require inspection once a year, as opposed to twice a year for roofs. Coincidentally, many items on a roof inspection checklist also appear on a wall inspection checklist. Examples are wall copings, edge metal and counter flashings. These flashing details appear on both checklists because both the roof system and wall system depend on these building components to keep water out. These components make the transition between systems and are shared by the roof and the walls. Their critical interdependence is further explained below.

The importance of construction continuity between a building's vertical and horizontal components  
To help illustrate and explain the relationship between roof, wall and horizontal waterproofing systems within the same structure, the concept of the "building envelope" has been developed. The building envelope maintains that in order to effectively keep water out of a structure, one must design and construct continuity between the vertical and horizontal components of the building's waterproofing systems.

Accordingly, one must consider walls when dealing with roofs, and vice versa. The key to understanding how the building envelope works is to realize that a waterproofing medium must exist between all vertical and horizontal surfaces, and to realize that the entire system is interconnected and overlapping at these interfaces. However, it is very important to understand that the transitions at vertical and horizontal interfaces need to be designed and constructed to compensate for differential movement between vertical walls and horizontal decks. This is accomplished by building flashing systems that are two-part (base and counter flashing).

What also must be designed for is differential movement within the same waterproofing system, such as in walls. This type of differential movement is due to lineal expansion and contraction. Vertical control joints should be built into a wall system to avoid vertical cracks in masonry walls, in particular. The size and location of control joints need to be properly designed and constructed to ensure their long term performance.

In summary, water can have devastating effects on a structure. Keeping water out of a building should begin in the initial design phase, otherwise a building can experience water infiltration issues early on in its life cycle. Good design then must be complemented by quality workmanship, coupled with the specification and the use of the right construction materials for the given application. The rest is up to the facility manager. The manager must have a good maintenance system in place, one that incorporates routine building envelope inspections.

The watertight integrity of the building envelope will only be as strong as the weakest link in the construction and maintenance chain. Facility managers play a critical role in keeping water out of a facility, as they are the maintenance link in the chain to the watertight structure.

Waterproofing is also integral to restoration work performed on historic structures with an additional layer of considerations associated with it. Concurrent with the necessity of sealing the building envelope in order to achieve a watertight facade from roof to foundation, is the goal of restoring the structure as close as possible to its original condition/construction. These considerations are beyond the scope of this article but further information can be found by visiting [www.mrwc.com](http://www.mrwc.com).

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