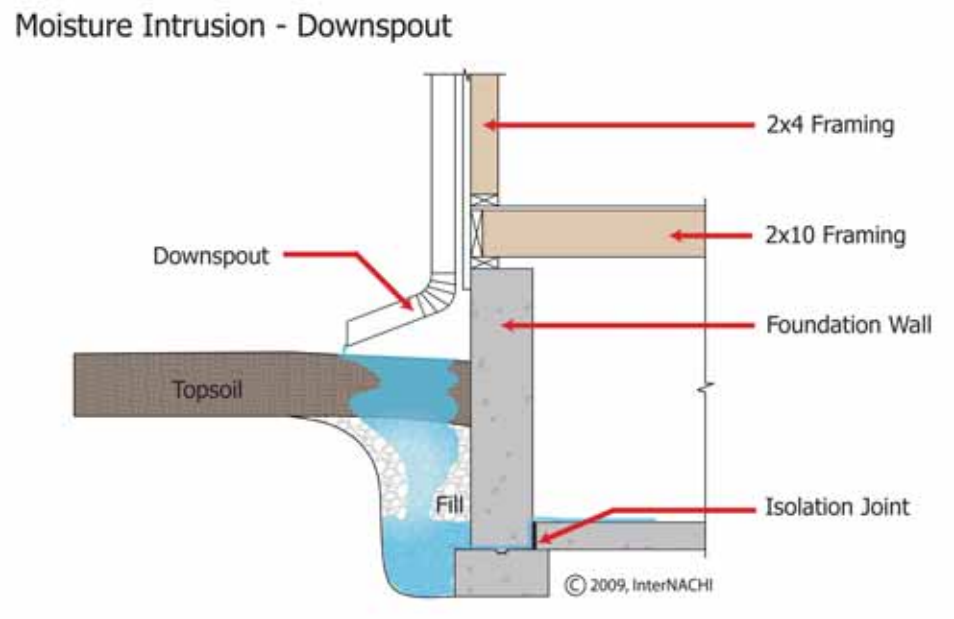
# Water Management & Damage Prevention:
## A Guide for Homeowners




This article provides homeowners with basic information to make these decisions and take the appropriate actions to keep their homes dry and comfortable. Use the information in this article to effectively communicate to your clients about water management and moisture damage prevention.

Designing, building, and maintaining homes that manage moisture effectively is a process of making good decisions. While builders and designers provide most of the up-front decisions, like designing the roof system or specifying the foundation drainage details – over the long term the homeowner must understand basic moisture issues and make good decisions at the right times.

There is already plenty of useful guidance for homeowners on what to do (or not do) regarding moisture. This article does not "reinvent the wheel" but will instead rely on available guidance for homeowners.

This article includes inspection tips that may help an inspector to spot common types of home moisture problems during an inspection. Most (if not all) moisture-related problems could become serious and expensive if not taken care of quickly and completely. Therefore, it is important for an inspector to call out or recommend further evaluations and/or repairs by qualified professionals when any moisture intrusion is observed.

**Houses and Water**

Water, in its many forms, is an ever-present fact-of-life for a homeowner. Households can use hundreds of gallons of tap water on a daily basis. Lots of rainwater must be successfully shed by the roof and siding during rainstorms. Groundwater moves through the soil beneath the foundation. Indoor humidity levels are controlled for comfort. Moisture in the forms of condensation and water vapor is absorbed and released by the house itself.

When a well built home is properly maintained, water is a benefit and a pleasure. On the other hand, uncontrolled water in our homes can cause damage. It can lead to mold growth, rotten wood and structural damage.

**It Repels Excess Water**

The exterior surfaces of a house, from roof to foundation, make up its envelope or 'skin'. The skin is designed to shed or repel excess water. If it doesn't, expect trouble. When roof flashings, windows, foundation walls, and other building components are not properly maintained, rainwater will find its way into vulnerable parts of the house.

**It Absorbs & Releases Excess Moisture**

All houses must absorb and release moisture constantly, in order to maintain a healthy balance. If the house has 'breathing' problems, many types of moisture problems can develop. Trapped moisture - dampness that cannot be released, for one reason or another - is one of the primary causes of fungus and mold growth in a house. Fungi can literally 'eat' wood, causing decay, rot and, ultimately, structural damage. Trapped moisture in the walls can destroy the value of the insulation and raise heating and cooling costs. Wood that stays moist attracts carpenter ants and other insects that can accelerate structural problems.

**It Transports Piped Water**

Directly beneath the 'skin' of the house is a complex maze of pipes carrying fresh water through the house and drain lines to dispose of water after its use. There are dozens of pipe joints and specialized fittings throughout the house, any one of which can develop a leak and cause moisture damage.

**It Needs a Firm, Dry Foundation**

The best foundation is a dry foundation. A water-damaged foundation is extremely expensive to repair and can lead to damage in the rest of the house. Ground water, flood water, or even rainwater from a misdirected downspout, can undermine the foundation and cause settling cracks, wet floors and walls, and lead to undesirable conditions.

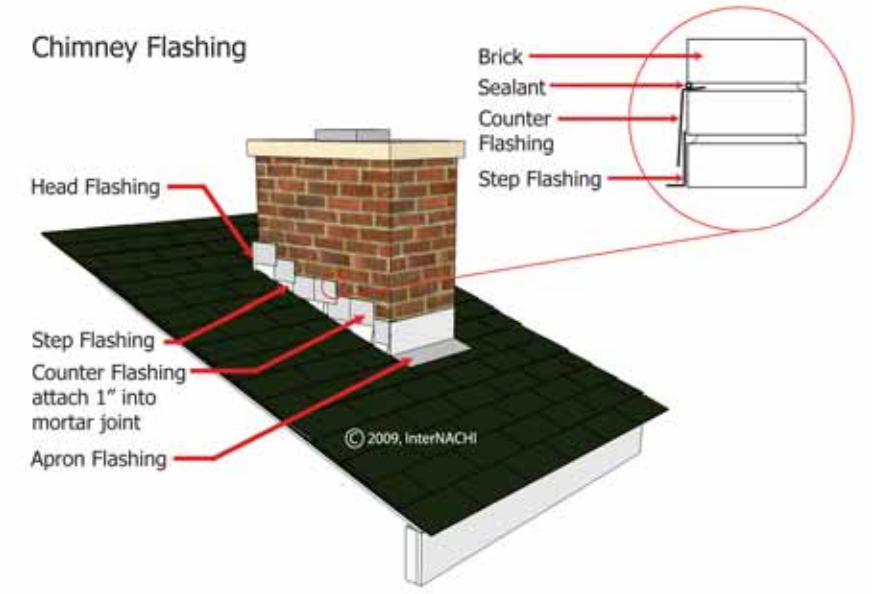
**Frequent Causes of Moisture Damage**

Unwanted water can intrude through cracks in the protective skin of the house. It can also accumulate from interior moisture sources.

The most common sources of moisture problems at the exterior a house include:

**Roof and Flashing**

Roofing materials can wear out, break, rust, blow off, or otherwise fail and expose the roof deck and structural components beneath to moisture intrusion and damage.




Most leaks occur around penetrations through the roof, such as at a chimney, plumbing vent, exhaust fan or skylight. Flashings and sealant joints around these penetrations can crack, fail and leak. Intersections of roof surfaces with walls are also a common leakage point.

Old or defective shingles can curl and crack, allowing moisture intrusion. If old shingles aren't removed before new roof shingles are applied, it can reduce the life of the new roof. Chimney caps can crack allowing water into interior areas of the chimney.

Shingle edges can fail, forcing rainwater to accumulate between the roof and gutter.

Flat or low-pitched roofs have unique maintenance needs and are susceptible to water problems because they may not drain as quickly as roofs with a steeper pitch.

Flat roof drains or scuppers can clog and hold water on the roof, increasing the risk, not only of a leak, but also of a possible collapse of the entire roof under the weight of the water.

**Gutters & Downspouts**

Clogged gutters can force rainwater to travel up onto the roof under shingles, or to overflow and travel down the inside of the wall, or to overflow and collect at the home's foundation.

First floor gutters can overflow if second floor gutters have been mistakenly directed to drain into them.

An insufficient number of or undersized downspouts can cause gutters to overflow.

Downspouts that don't empty far enough away from foundation walls can lead to foundation wall damage and a wet basement.

**Ice Dams**

Inadequate attic insulation allows heat to escape from the house into the attic, which can turn rooftop snow into an ice-dam along the eaves. Ice dams frequently force moisture to back up under the roof shingles where it can drip into the attic or walls.

Clogged or frozen gutters can act like ice dams, pushing moisture up under the shingles and into the house.

**Soffits and Fascias**

Damaged soffits (horizontal surfaces under the eaves) can allow snow or rain to be blown into the attic, damaging the insulation, ceilings and walls.

Fascia boards (vertical roof trim sections) are damaged, allowing the moisture from rain and snow into the attic and atop interior walls.

**Weep Holes**

Weep holes, which are designed to allow moisture to escape from behind walls, can become

blocked.

Weep holes can freeze, forcing moisture to back up inside the wall cavity.

Weep holes can become clogged with landscape mulch, soil or other material.

**Landscape or Grading**

Recent landscape modifications may have resulted in water drainage back towards the foundation, rather than away from it.

A newly built home lot may have been graded improperly, or the original foundation backfill may have settled over time, causing drainage problems.

Automatic sprinklers may be spraying water onto or too close to the foundation walls.

**Window & Door Flashing or Seals**

Cracked, torn or damaged seals, weather stripping, and flashing around windows or doors can allow windblown moisture to penetrate your house.

Improperly installed windows and doors can allow moisture into the wall.

Failed or worn weather-stripping can allow wind-driven rain to penetrate a closed window or door.

**Groundwater or Rainwater**

Groundwater or misdirected rainwater collects during wet seasons along the foundation wall or beneath the floor or slab. Unless it is directed away from the structure by a sump pump or corrected drainage, this moisture can lead to mold growth, wall failure and other destructive moisture problems.

**Condensation**

Condensation on windows can, at a minimum, damage windowsills and finishes. At worst it can damage walls and floors as well.

Condensation on un-insulated pipes can collect nearby or travel along a pipe, to accumulate far from the original source.

Condensation can form inside improperly built walls, and lead to serious water damage and biological growth that are hidden from sight.

**HVAC**

Lapses in regular maintenance can lead to moisture and comfort problems, ranging from clogged drain pans to iced-up cooling coils and mold within the system.

Failure to clean and service air conditioners regularly can lead to diminishing performance, higher operating costs and potential moisture problems.

Humidifiers can add too much moisture to a house, leading to dampness and mold.

**Sump Pump**

Neglecting to test a sump pump routinely - especially if it is rarely used - can lead to severe water damage, especially when a heavy storm, snow melt, or flooding sends water against the home.

Overload of the sump pump, due to poor drainage elsewhere on the property, can lead to pump failure. Frequent sump operation can be a sign of excessive water buildup under the basement floor, due to poorly sloped landscaping, poor rain runoff, gutter back-flows and other problems.

Lack of a back-up sump pump, which can be quickly installed in the event the first pump fails, can lead to serious water damage and property loss. This is especially important if the sump pump is relied upon to maintain a dry basement, or if the house is located in an area of seasonally high groundwater. Sump failure can cause extensive water damage and the loss of valuable personal belongings.

This information was adapted from the home maintenance book authored by Ben Gromicko titled, “Now that you’ve had a home inspection.” http://www.nachi.org/home-maintenance-book.htm