

Water Inside Your Building Means Something Is Wrong on the Outside

“Water, water everywhere” is not what you want to be thinking as you’re standing in the living room of a townhouse condominium unit or peering into the lobby of a high rise. Water inside any attached housing structure means likely damage – to furnishings and fixtures, floors and walls; it also means the possibility of rotting wood and mold risks; it means potential liability for residents of a shared ownership community; and it means something has gone terribly wrong.

When community association managers and board members worry about weather-related water damage, they are usually thinking about the damage caused by flooding at the bottom of a building, or by a leaky roof at the top. But engineers think in terms of “water intrusion,” which may result from a flood or a leaky roof, but is more likely caused by construction flaws in a building’s envelope – the components that separate the interior from the exterior. We’ve evaluated thousands of buildings over the past 20 years, and many of the water problems we’ve seen have resulted from water intrusion on the vertical surfaces running between the foundation and the roof.

Flooding is a singular - and singularly dramatic – weather event; it is an act of nature. The conditions that permit water intrusion, by contrast, are man-made. The lyric to an old song, “Why am I soft in the middle,” comes to mind. Many condominium buildings are, if not “soft in the middle,” considerably less water tight than they should be and more vulnerable to water intrusion as a result. Windows and doors siding, balconies and surface “transitions” are particularly problematic.

WINDOWS AND SIDING

If you had asked me 15 years ago how to ensure that your windows would be water-tight, I’d have recommended a specific brand. Today, I’d tell you that it’s not the type of windows you select that matters most; it’s how well they are installed. A low-quality window installed correctly can be perfectly water-tight; the best quality window installed poorly will imitate a sieve.

The same can be said of siding. Experts will debate endlessly the relative advantages of different products. There are many of them and there is no question that some are better than others. But if water is seeping into the building, we find, it is most often the quality of the installation, not the quality of the product that is at fault.

One of the most common installation mistakes is the incorrect layering of building envelope materials, such as the house wrap, the flashing or the siding itself. When this occurs, water isn’t shed properly from one material to another; it accumulates behind the materials and penetrates the structure.

Incompatible materials in the building envelope can also permit water intrusion by creating temperature variations that can cause sealants to fail.



HOA Advisory #100

Page 2 of 4

Failing to recognize how different products perform is another common problem. The brick veneer certainly looked quite nice on the buildings in the condominium project that was experiencing severe water intrusion problems. But brick isn't water tight, and the contractor had failed to install "weep holes" through the veneer, necessary to allow water to drain. As a result, water accumulated behind the veneer, creating mold problems that were so widespread and so costly to cure, the developer was driven into bankruptcy.

BALCONIES

Interior living spaces leading to an outdoor balcony are a common feature and an appealing amenity in many attached dwellings. The problem here comes when the surface of the balcony is on the same level as the living room floor, instead of a step down from it. A flat transition from the living room to the balcony is often an accessibility requirement, to permit ease of access for someone in a wheelchair. But in a heavy storm, wind-driven rain may be forced under the door sill and into the living room.

A flat transition isn't the only design feature that can create water problems. The balconies in one project on which we worked had walls on all sides. Drains on the deck floor conducted water through a network of pipes to the ground when it rained. This arrangement worked just fine in the summer. But when the pipes froze in the winter, water collected on the balconies instead of draining from them, turning the balconies into bathtubs (we called them 'bathtub balconies'). With nowhere else to drain, the accumulated water flooded the attached living rooms.

COOL DESIGNS

The old Chinese curse "May you live in interesting times" has an engineering equivalent – "May you live in interesting buildings." The features that create cool effects can also create water intrusion headaches, of which the bathtub balconies are just one example. Varying the materials, using different shapes and inserting angles all add architectural interest to a building; but every angle you create, every transition you make from one shape or material to another, creates a point at which water may intrude. Transition or termination points represent a tiny portion of a building's envelope, but they account for much of its vulnerability to water. And they don't always receive the extra water-proofing attention they require.

FROM THE INSIDE OUT

While many water intrusion problems result from something builders fail to do, some are caused by what builders, or the subcontractors working for them, do. Consider the plumbers, electricians, and HVAC mechanics who come into a building that has been framed, wrapped, and made water-tight, and poke holes through that nice, water-tight surface. The wall penetrations are necessary to make connections that run from the inside out, but they also have to be properly waterproofed, and they often are not.

The technician who installed a security system clearly wasn't thinking about water penetration when he drilled holes through a window sill to attach the sensors. He was thinking only about the equipment he was installing in that unit – not about the impact the installation would have on the rest of the structure.



HOA Advisory #100

Page 3 of 4

Many residential builders, like this technician, tend to view the building envelope as a series of individual components – roof, windows, siding, balconies and doors —rather than as a single system that must run continuously and seamlessly around the building. That’s why the small details that can create immense water intrusion risks are so often overlooked.

CONTROLLING THE RISKS

Water intrusion is a potential risk for all attached housing structures. But it is a risk the boards and managers of homeowner associations can reduce by being mindful, diligent and proactive.

1. **Don’t ignore early signs of water intrusion.** If you see water stains on walls; if there is water, even a small amount that appears only occasionally around windows or door sills, investigate. Don’t assume the water inside a window results from condensation. It could be seepage from the outside.
2. **Bring in experts at the outset.** They can provide the objective analysis you need and they can be held accountable for their findings.
3. **Don’t assume water intrusion in one unit is an isolated problem.** View the first unit as the canary in the mine. Have your experts spot check other units for evidence of the same problem. If there are water stains on an interior wall, use a moisture meter to check for moisture in other units. If poorly installed windows are leaking in one unit, have a company that specializes in water-resistance-testing check other windows in the development.
4. **Take care of preventive maintenance.** This includes more than painting or roof repairs. Both are important, but so are many other items boards tend to overlook. Caulking around door sills, window frames and envelope transitions is one example. Caulk lasts a long time, but it doesn’t last forever. Experts suggest re-caulking every 5 years on average – less frequently in some areas, more frequently in others, depending on the climate. Weather stripping around doors and windows doesn’t last forever either. It should be replaced every 10 years or so.
5. **Consider flooding risks.** Although most water penetration risks are centered on the building envelope, ground level flooding may also be a concern. The violent weather patterns created by climate change are intensifying flood risks in flood-prone areas and creating flooding risks where they never existed before.

If flood risks in your area are high, a civil engineer can help you determine what mitigation measures, if any, you should undertake. For example, re-waterproofing the outside of foundation walls or upgrading an exterior foundation drainage system might be indicated.



HOA Advisory #100

Page 4 of 4

Look up as well as down. If the gutters on your roof are too small or poorly designed, they could direct torrents of water onto the ground in a heavy rain. Also consider neighboring properties as well as your own. Sometimes poor drainage from one site can cause flooding on an adjacent one.

6. **Don't look for short-cuts.** Identifying the source of a water intrusion problem can be difficult and costly, but ignoring the problem won't eliminate it. The sooner you identify the cause of a water intrusion, the more controllable it is likely to be.

If the problem is systemic, you will have to deal with it systemically. There are no Band-Aids for water intrusion. If transitions on the building's surface weren't set properly, you have to re-do them. If the windows weren't installed properly, you may not have to replace them, but you will have to re-install them. These measures are going to be expensive. But they will be far less expensive than dealing with the damage water intrusion can do to buildings, to the personal property and health of residents, and to the finances of a common interest ownership community.

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