What is a Building Envelope

Homeowner Protection Office

WHAT IS IT?

The building envelope includes all the building components that separate the indoors from the outdoors. Building envelopes include are the exterior walls, foundations, roof, windows and doors.

The performance of the building envelope is impacted by a number of sub-systems, such as heating, cooling and ventilating equipment, plumbing and electrical systems. The interaction of the sub-systems with the components of the building envelope, as well as certain activities of the occupants, can effect the performance of the building envelope.

WHAT IS IT SUPPOSED TO DO?

The building envelope should keep out:

- temperature extremes
- moisture, as vapour or liquid
- dust
- wind

Additionally, to maintain durability, the building envelope should not permit weather elements to be trapped inside the walls. This may cause wall components to deteriorate, and continue to decay. In the early stages, it can usually be remedied relatively inexpensively. As time progresses, costs increase exponentially.

MAINTENANCE AND INSPECTIONS

The building envelope, like a car, requires regular inspection and maintenance. Do not be lulled into thinking, "we haven't had any complaints so everything must be OK!" Some maintenance guides suggest the exterior of the building does not need much attention in the early years. The numerous failures of building envelopes in the costal climate zone of B.C. suggests that it is wise to have an inspection program in place that starts in the first year of occupancy in a building' and continues annually thereafter. This inspection should be done by an experienced professional.

If problems can be detected early, before obvious damage is caused, they can be remedied at much less expense and while any existing warranty programs are still in effect.

PREVENTING PROBLEMS

If your strata corporation does not have a schedule for maintenance and inspection of the building envelope:

- Communicate the need for this precaution in writing to the strata council.
- Attend the Annual General Meeting (AGM) and explain why a maintenance program is important. If possible give examples of problems encountered by other condominium complexes that were aggravated by the lack of a maintenance program.
- Put forth in a motion to the AGM the need for a maintenance program and that it is recorded in the minutes of the meeting.

HOW DO YOU KNOW IF THERE IS A PROBLEM?

A problem likely exist if there is:

- no regular inspection and preventative maintenance program in place
- mould or fungi formation
- wood rot
- water flowing down the sides of the building instead of running off from the eaves and drainpipes
- wind blowing through the walls
- peeling paint
- cracked or missing sealants (caulking)

or if there are:

- water stains on inside walls, ceilings or inside the foundation
- gaps that allow the weather to get through the walls
- pools of water on the decks
- windows that are wet on the inside.

These problems may not all be related to a failure of the building envelope:

- Some may be localized maintenance items that can be fixed relatively inexpensively
- Some may be caused by interior systems in the unit. For example, an un-vented clothes dryer will create moisture inside.

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- Some are caused by certain activities of the occupants. For example, hanging wet clothes inside will create excessive moisture.

If any of these symptoms are present, do not ignore them and do not delay in determining the cause. Sometimes owners think, "if my strata unit is OK, I don't have to worry." A building envelope failure is a problem for the entire strata corporation. Everybody pays.

RAIN PENETRATION

Generally there are three factors which are needed for water to penetrate into a building, presence of water on the exterior of the building; an opening for the water to move through, and a driving force (such as wind or gravity).

Wind will create a pressure difference between indoors and outdoors. In both face seal and rainscreen systems, this pressure change occurs primarily at the most air-tight element in the wall construction. This air-tight material is referred to as the air-barrier.

Face seal refers to a strategy for rain penetration control that relies solely on the elimination of holes in the exposed exterior face of the assembly.

Face sealed walls rely on creating a completely impervious barrier to water at the outer face of the wall. This is also the air barrier, thus it is at the surface at which the pressure drop occurs. This surface is frequently wetted, and any imperfections in the face seal will certainly lead to air movement through the holes, which in turn will create the driving force required to bring the water into the wall assembly, and trap it there. The water remains in the wall, or dries slowly, causing deterioration of wood components.

The below figure graphically shows the performance of face seal wall assemblies.

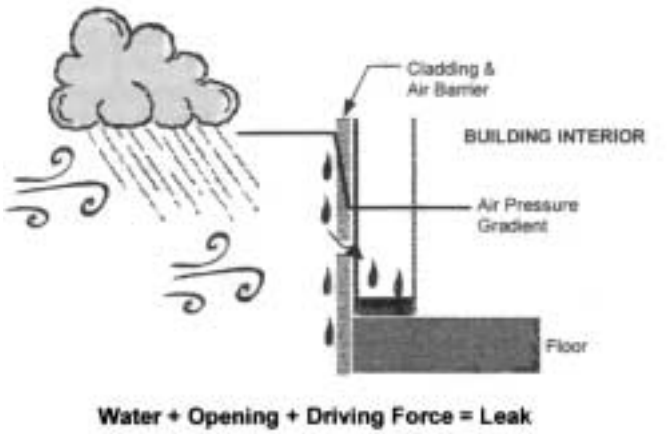

FIGURE 3-2: PERFORMANCE OF FACE SEAL WALL ASSEMBLIES

Rainscreen assemblies refers to a construction strategy for rain penetration control that relies on the deflection of the majority of water at the cladding but also incorporates a cavity which provides a drainage path for water that penetrates past the cladding.

Rainscreen technology recognises that some incidental water may penetrate the exterior cladding, but allows this water to drain through the rainscreen cavity. Rainscreen technology can come in many different designs, and has been evolving since it's earliest use in the late 1940s. In the example shown below, the air-barrier is illustrated to occur across the sheathing paper that is on the exterior surface of the sheathing. The cladding is not air tight, and in fact, deliberate openings are left to facilitate drainage and drying. The pressure drop therefore occurs primarily at the sheathing paper. By moving the pressure drop away from the cladding, the driving force is removed from the cladding, which greatly reduces the potential for water to move past it. The small amount of water that does pass through the cladding drains through the cavity, leaving the interior of the wall assembly dry.

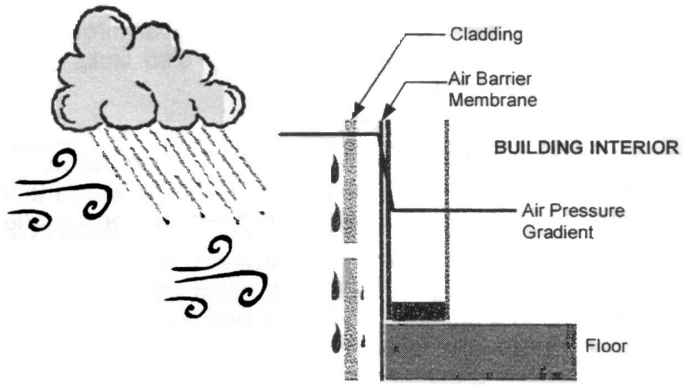

FIGURE 3-3: PERFORMANCE OF RAINSCREEN WALL ASSEMBLIES

FOR MORE INFORMATION CONTACT

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