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Eagle's Eye on Housing:
What Caused Fungus Growth in Siding?

Cause: Describing what is happening requires a basic Building Science understanding of Moisture Flow Mechanisms. Moisture moves by either *gravity, capillarity / wicking, vapour diffusion* or through *airborne vapour transport*. The picture shows a mid-1990s modular home using Panel Type Siding attached directly to the wall assembly. Rain-driven moisture is running down the siding *(gravity)* and penetrating into the wall assembly at joints of the exterior wall cladding *(capillary)*. Failed caulking and the lack of flashings at horizontal junctions have compounded the problem. Once the moisture has penetrated the cladding face, it remains trapped, providing a source of moisture for the fungus pictured. Not surprisingly, once the panels were removed, the interior wall-space cavities were also mouldy.

With Acknowledgement to the Better Builder Series

Rain and snow can penetrate building cladding systems when there are openings, and when there are sufficient pressures to drive the water into the assembly. Despite wider roof overhangs and cantilevered projections, walls will still get wet during rain storms that are accompanied by driving winds. Proper flashings and sealants represent the first line of defense against rain penetration. Even good-quality exterior caulking and sealants can develop cracks over time as materials age and building elements shift. Eventually, water will enter through those cracks. Protection of wall sheathing with properly installed house wrap (Tyvek, for example) is referred to as the *Second Plane of Protection* in the NBC 2005.

If the driving forces are controlled and accommodated in the design, rain penetration can be effectively controlled. Water entry from *capillary action, gravity and air pressure differences* can be controlled through rain screen design principles. Through the introduction of an air space behind the cladding (or joint), and additional venting, air pressure behind the cladding can equal that on the face of the wall, eliminating the force responsible for causing moisture to move inward by air-pressure gradients.

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The Simple Rain Screen Wall

The simple rain screen wall consists of an outer layer of siding or cladding, and an inner wall separated by an air space (Figure 9a). The air cavity must be equipped with drains at the bottom of the cavity to remove any moisture which accumulates in the cavity. This air space also prevents the entry of water into the building assembly through capillary action. The NBC 2005 edition refers to this cavity as a *capillary break*. To perform effectively, the rain-screen design requires an effective *air barrier system* within the building envelope (either at the inner face of the wall or as a component of the exterior sheathing).

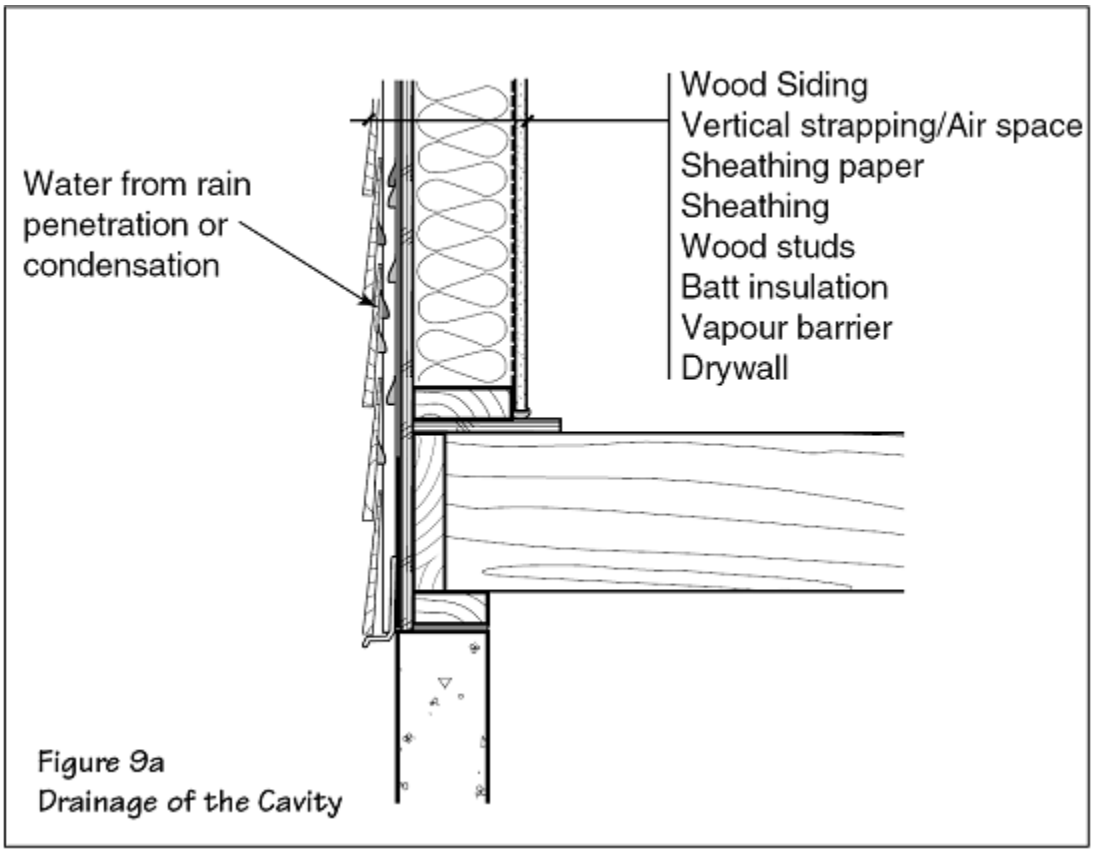

Figure 9a
Drainage of the Cavity

Installing a cavity in the wall system, comprised of 1x2 vertical strapping, and providing a moisture-resistant coating to the interior face of the cladding is one example of *a simple rain screen system*. A more familiar example would be brick-faced cladding.

Brick-faced cladding does indeed have an air space *(capillary break)* with weep holes installed at the bottom to let condensed moisture drip out of the cavity space. This may be an acceptable solution to areas that have less than 60 inches of rain in a given year. However, building science also takes into account air-pressure flows *(air moves from high pressure to low pressure)* taking with it uncontrolled moisture flows. If your area has more than 60 inches of rain a year, consider *a pressure-equalized rain screen system.*

For more information, see CMHC Research Highlights: The Rain Screen Wall System (order # 70139), which clarifies the difference between *simple rain screen systems* and *pressure-equalized rain screen systems*.