

**Prepared by;**

Ron D Young CIEC, *Principal Consultant*

**Council-certified Indoor Environmental Consultant**

"This designation has been accredited by the Council for Engineering and Scientific Specialty Boards (CESB). The CIEC is now recognized by CESB as an **Engineering Technician designation**, Engineering technicians solve technical problems in research and development, manufacturing, sales, construction, inspection, and maintenance by using science, engineering and mathematical principles.

---

## **Building Science/Systems Approach**

The science of how all components of a building work together has become known as **Building Science** or a **Systems Approach**. The Systems Approach is a method of design, construction, [inspection and field testing](#) that considers how all building components interact, including the foundation, walls, roofs, doors, windows, insulation, and mechanical systems.



One thing this approach to understanding why buildings fail is first to understand, that it's okay for buildings to get wet, as long as they can dry-out. We have learned that some materials can stay wet for some long period others not. Living trees for example are wet wood and can stay wet for hundreds of years. That same level of wet in a living tree can cause decay/rot in a dead one. Dead wood (lumber) spruce, fir, and pine wood will begin to rot if 28% of their weight is water. It literally has to stay under 20% to stop them from rotting and you have to keep the wet (moisture) under 16% to stop biological contamination from growing. Technology in recent years combined with ecology and energy conservation to conserve our resources has developed building components *that cannot get wet* for any extended period, such as: particle boards, OSB (oriented-strand-board), and papers.



When we cook and process the dead wood particles, they separate into cellulose fibers which, are used in paper manufacturing. Paper has a tremendous amount of processing, tenderizing, and blend wood fibers. It has become a perfect predigested 'baby food' for Mold. The 'Three Little Pigs' provide a lesson that continues to hold true even today. Straw and sticks (dead wood) don't have the longevity of brick, stone, and other cementitious building components. However, the dumbest of the three little pigs didn't build their homes of paper.

Almost all modern building interiors are wrapped in paper found on gypsum wallboard (drywall). The gypsum center absorbs and holds the water like a sponge in direct contact (sandwiched) with the paper it is faced with. To put it simple we are using a building component that's really an instant biological food source – just add water, let it marinate for a few days and 'walla', dinner is served...*biological contamination*. With a little water for a long time (weeks to months) or a lot of water (flood) for a little time (days), we get biological contamination on gypsum wallboard, OSB, paper underlayment, and the latex carpet binder.

Buildings today that are being built for the most part are mechanically controlled sealed boxes, they can handle a certain amount of moisture, however, their moisture handling capabilities are easily exceeded. With that being said **"any inspector/consultant/engineer must learn to think like water"** to properly diagnose a building using the **Building Science/Systems Approach**...



**This now leads us to your 'Building Diagnostics'...**