

IAQ - Anticipating massive failures with Building Science

The study of building science is one that has been ongoing in Europe for many years. Recently, North America has started looking at building science in the construction of new buildings.

Building science is the study of construction techniques with the goal of improving insulating abilities, and managing the movement of moisture and heat into and out of the built environment. Simply put, building scientists consult on buildings before & during construction, and after they fail.

For the past 16 years, I have attended the "Building Science Summer Camp" which is held annually in Westford, Massachusetts. This program, put on by one of the world's leaders in building science consulting, gives attendees the opportunity to learn about leading-edge construction materials and techniques, and to see examples of buildings that have failed. This kind of information has provided tremendous insight into the work that I do.

Much of my work involves investigating building failures for the government. Occasionally, that work involves leased spaces. A majority of the work, however, involves General Service Administration (GSA) owned buildings including U.S. Court Houses, border crossing stations, national wildlife refuge buildings, FBI Facilities, Social Security Administration offices, and the like. Each style of building, and the age of the building, comes with its own unique challenges.

Some of the most challenging building science work that I have done has been at Social Security Administration buildings. These buildings are usually freestanding office buildings of between 10,000 to 20,000 ft.² each. Often, the buildings are designed by different architects, for a variety of owners, always constructed by different contractors, and usually built by the lowest bidder. That spells a recipe for disaster.

A couple of years ago I was asked to check a freestanding Social Security Administration office in Alice, Texas. The building was less than 6 months old and was already going through a mold remediation project. Through the use of the building science techniques I've learned, I was able to determine that all brick walls had bad mortar joints, the drain cavity was filled with mortar slag, one-half of the windows were slanted in at the top, flashing at the perimeter of the roof was leaking, and the HVAC system depressurized the building (not pressurizing it). Plus, the vapor retarder was located in the wrong location, trapping water vapor. This all resulted in providing the rain and water vapor a pathway to the inside surface of the exterior walls (which were covered with vinyl wallpaper). These weren't incremental problems. They were serious blunders causing nightmares for the tenants. Personally, I think it was a "low-bidder" job that was completed using untrained or unsupervised workers.

Getting involved in evaluating building failures means that I need an entirely different set of analytical tools and equipment. The expense, however, has been worth it!

Knowing how buildings fail provides insight (on my client's behalf) for making sure the buildings work properly. And if I can look at a building today, and anticipate a failure six months from now, I can advise my clients before it happens. That is always a good thing!

More soon!

-Travis West