



LET'S TALK ABOUT... MOISTURE & MOLD

PLAN FOR IT.

It's important to note that "doing it right the first time" doesn't just assist in solving moisture management issues. It lessens the potential for other liability issues, reduces callbacks and, in the long run, makes happier customers who are more likely to refer you and buy their next home from you.

THIS YEAR, WE'VE HAD OUR SHARE OF MOISTURE AND MOLD. WE NOW KNOW MORE ABOUT STACHYBOTRYS, ASPERGILLUS, AND THE LIKE, THAN ANY NON-BIOLOGIST WOULD CARE TO KNOW. HUNDREDS OF MEDIA-PUBLISHED DISCUSSIONS CITE ANYWHERE FROM 22,000 TO 100,000 VARIETIES OF MOLD AND FUNGI. "MOLD EXPERTS" HAVE CRAWLED OUT OF THE WOODWORK WITH A WIDE VARIETY OF MOLD IDENTIFICATION KITS, REMEDIATION STRATEGIES, AND EVEN "MOLD SNIFFING DOGS" BY THE NAMES OF OSKAR AND NINJA.

Moisture issues, ranging from simple complaints to massive lawsuits, are piling up from California to New Jersey. In 2000 and the first half of 2001, there were more than 17,000 individual mold-related insurance claims in Texas alone.

Successfully contending with moisture management issues in home design and construction focuses on two simple concepts:

- **Do it right the first time.**
- **If you haven't, respond to resulting issues quickly and thoroughly.**

Visible water leakage, while not a minor problem by any means, is the least of the worries. Because it's apparent, either you or the homeowner will notice and you can take immediate action. Water leakage you can't see is what you should worry most about.

Two hidden conditions have the potential to create serious problems.

1) Slow introduction of water to the building over a long period of time. From a pinhole in a pipe to a poorly caulked shower door, gradual introduction of moisture dries slowly, and provides time for mold activity. As affected materials degrade, they hold more moisture, compounding the condition.

2) Failure of exterior water management strategies. Use of caulking and sealants to stop water is a primary suspect. In commercial structures, caulking is a strategy that is sometimes effective only because it's backed up by effective maintenance schedules. In residential buildings, caulking starts as an inconsistently applied material, and ends as a maintenance nightmare. As caulking and sealants fail (inevitably, they do) small amounts of water are introduced into the structure. As the failure compounds, shrinkage creates a direct path for larger amounts of water. (Continued on page 2.)

Water is everywhere. It comes in from the outside and out from the inside, and is absorbed into virtually everything, providing a veritable petri dish for mold growth in today's building materials. Glue, paint, wood, paper, and invisible bio-films offer an inexhaustible food source for these little buggers.

Planning for drainage and drying, rather than assuming that it's possible to keep things dry, is an excellent step in preventing moisture damage.

Managing issues efficiently, as well as carefully documenting problems and causes, is one of the first steps in developing effective long-term solutions. If an event occurs frequently, it is a clear indication that the current design and/or construction is unsuccessful, and needs to be reevaluated.

Moisture isn't the only thing you should plan for. Plan for litigation. The best thing you can do for your company is to plan in advance to defend your practices by showing a deliberate approach to quality control.

MOISTURE DAMAGE IN BASEMENT



FYI: The cause of many moisture problems is the lack of a deliberate quality approach to the construction process, inadequate response time and strategy to customer complaints, and ultimately, the lack of a thorough water management strategy.



VISIBLE MOISTURE ON THE REAR CONCRETE BLOCK IN THIS CRAWLSPACE CAN CONTRIBUTE TO MOLD GROWTH IF NOT ABLE TO DRY. WHITE STAINS ON THE SIDE WALL ARE INDICATIVE OF PREVIOUS MOISTURE PROBLEMS.

Two things to remember:

1) Water management is a proactive event.

Be deliberate. Don't short-change designing and building your homes for performance. In the long run, carefully engineering your homes and implementing effective quality control procedures will save your business precious time and money. Potential liability and health issues, including moisture damage, can be dramatically decreased by doing it right the first time.

2) Don't dally.

Clean-up must be immediate and thorough. It may sound over-simplified, but the primary failure in response to homeowner complaints is simply the fact that builders do not respond fast enough, or with the emphasis that the issue is potentially serious and needs active, rapid response. Get damaged materials out as quickly as possible, utilizing careful clean-up strategies to prevent home, homeowner, and staff exposure to mold spores. Framing cavities adjacent to the affected area must be inspected to make sure that no damage is present. Old material must be removed, and clean, sound surfaces must be prepared before new material is introduced. Stopping short of examining all potentially affected areas creates room for recurrence.

Summerset at Frick Park

who says **quality** doesn't sell?

How do you turn an abandoned industrial waste site into a gold mine? By transforming it into a neighborhood featuring high quality homes that are comfortable, durable, healthy, safe, and energy efficient. Summerset at Frick Park, a new community development in Pittsburgh, PA funded in part by the Department of Energy through the Building America program, is successfully turning what was once an eyesore into a valuable asset for the city—and for builders.

For 50 years, until the early 1970s, Pittsburgh-based steel manufacturers dumped tons of slag, a byproduct of the steel-making process, into a valley east of the downtown area. The 238-acre slag heap was an unused waste site until 1999, when development at Summerset at Frick Park began.

Demand for the first 52 homes to be constructed was so strong that a lottery was held last year—where all the homes were sold in 1 hour and 15 minutes. 800 potential buyers have signed up for the next building phase lottery, in which approximately 54 lots will be sold. And, a grand opening public event in February drew more than 2,500 people to tour six model homes in a 6-hour time frame.

The 710 homes to be built in three phases over seven years will boast innovative housing technologies and quality construction practices, like being **30% more energy efficient** than homes comparable in size. New, more **durable building materials** will be used.

Improved construction practices, like durable flashing products, wall drainage planes, and a water management system at the foundation will provide moisture control. And carefully considered engineering designs will contribute to good airflow distribution through rooms.

Summerset's location is convenient to downtown Pittsburgh, a business district, universities, and the city's popular public park, Frick Park, which will be expanded to include a site owned by the Urban Redevelopment Authority through funds from the U.S. Army Corps of Engineers and local private foundations. It is modeled after traditional Pittsburgh neighborhoods, with detailed architectural exteriors, a pedestrian-friendly atmosphere, landscaped lawns leading to front porches, and tree-lined streetscapes.

With such high demand, lucrative sales for the builders are guaranteed. In addition, the quality of the homes will increase homeowners' satisfaction and promote customer referrals.

Because the homes are built for durability, health and safety, there is a reduced chance for liability issues that may result from mold and deterioration. Callback and warranty expenses will also likely be decreased.

Summerset proves that quality does sell—and benefits not only homeowners, but builders as well.





don't forget about the BASEMENT

IF YOU LIVE IN A HOME WITH A BASEMENT, YOU KNOW HOW VALUABLE THAT SPACE IS—WHETHER YOU STORE BOXES OF KEEPSAKES AND CLOTHING, OR UTILIZE THE SPACE FOR PROJECTS OR LIVING SPACE.



Chances are your basement is also cold, damp, and/or musty. We all simply accept this, mopping up after rainstorms and creating raised spaces for storage, but it's not a necessary condition. Consider this in the homes that you build, as well as the one you live in.

The key to a livable basement (rather than one where things like to live) is applying appropriate methods to insulate the walls, control moisture, and to heat and cool the space.

Moisture control is the key area that can quickly become a pain—but, it's also the most important aspect of creating a healthy and livable space. Paying close attention to basement construction, water-proofing and insulation is absolutely critical in creating an effective moisture management strategy.

Preventing Moist Basements

A carefully engineered moisture management strategy must be implemented to control moisture in basements. These key preventative steps are just part of an overall strategy:

- Provide properly sloped grade, away from the home
- Apply good quality damp-proofing or water-proofing
- Ensure drainage on the exterior of the foundation, protecting the area from silting
- When insulating on the interior, stop convection behind the insulation with air sealing methods, or apply un-faced extruded rigid insulation directly against the foundation wall
- Allow drying to the interior—i.e. no vapor retarder on the inside surface
- Keep air circulating behind storage areas
- Provide supplemental dehumidification during humid periods.

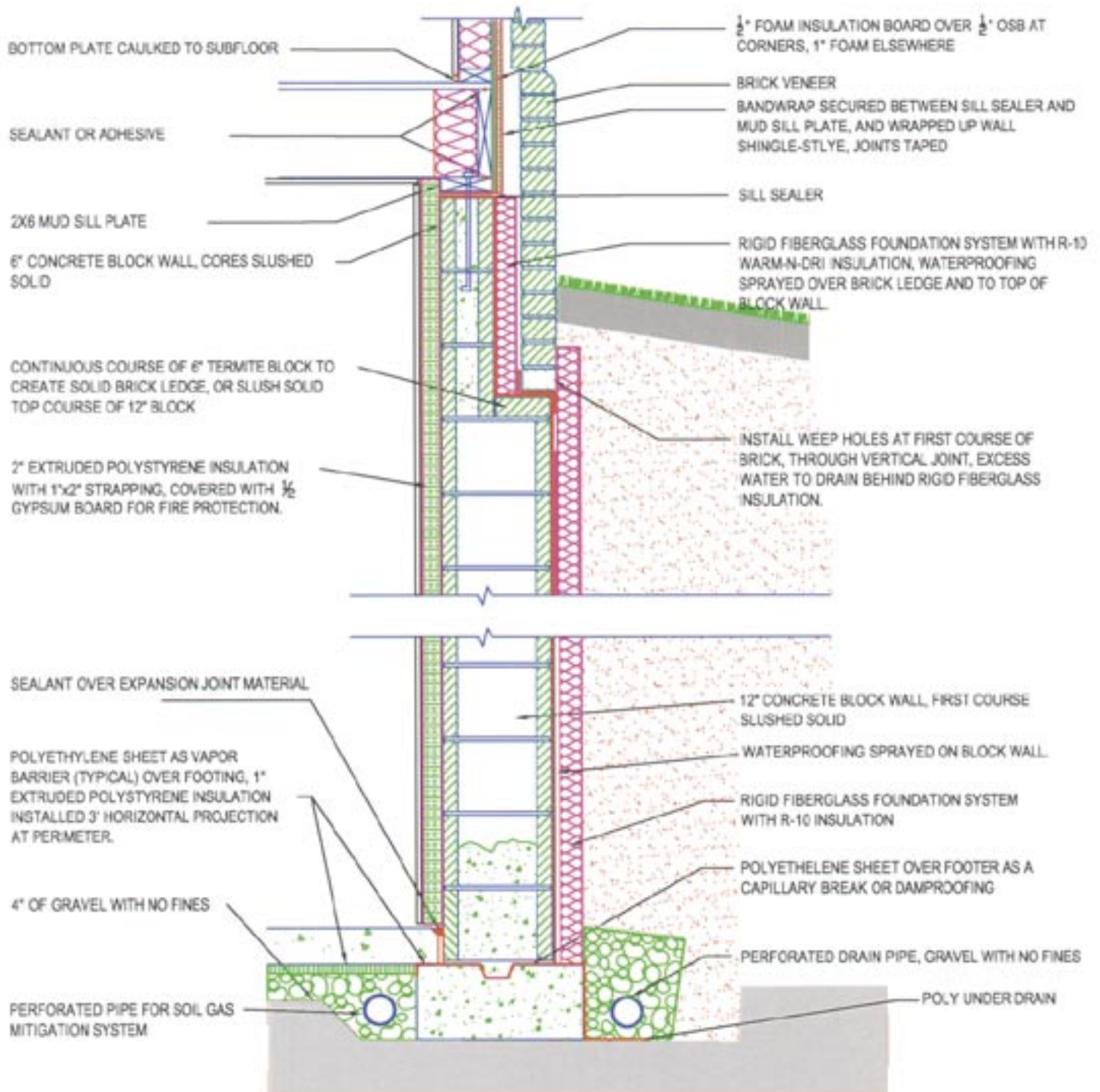
The Science of Moist Basements

The soil around foundation walls can contain a large amount of moisture from surface water seeping down or from a high water table. This water inevitably finds its way inside (gravity) or through a crack or flaw in the water protection layer of the foundation (oops). Water can also be pulled up through the foundation by a wicking action or pushed up by hydrostatic pressure from the soil under the walls or floor. In summer, warm moist air from outside can enter the house and result in condensation on the cool basement walls or floor. Indications of basement moisture problems often include:

- Foundation cracks that leak
- Standing water that results from bulk water that can't drain
- Efflorescence (white, chalky stains)
- Wet decaying wood in contact with concrete
- Damp or moldy walls or floor
- Condensation on windows, pipes and other fixtures
- Wet insulation (which loses its insulating capability if it can't dry)
- Moisture damaged finishes
- Musty or damp carpets
- High humidity
- Stuffy, damp smells

BASEMENT

Moisture Control



THIS DETAIL SHOWS THE BEST PRACTICE FOR BASEMENT MOISTURE CONTROL.

VENTILATION...

ISN'T JUST ABOUT THE BATHROOM

Poor indoor air quality doesn't just negatively impact the health of the home's occupants. Increased moisture and pollutants due to lack of ventilation, chemical and product "outgassing," and daily occupant activity, can increase builder's liability and callbacks, as well.

AS A COMPONENT OF A THOROUGH MECHANICAL VENTILATION STRATEGY, HEAT RECOVERY VENTILATORS, ENERGY RECOVERY VENTILATORS, AND AIR EXCHANGERS IMPROVE INDOOR AIR QUALITY AND CONTRIBUTE TO THERMAL COMFORT BY DISTRIBUTING FRESH AIR THROUGHOUT THE



MECCHANICAL VENTILATION, WHICH DILUTES OR DISPLACES INDOOR AIR WITH OUTDOOR AIR, IS ESSENTIAL IN AIRTIGHT HOMES. CODE-REQUIRED CHANGES IN BUILDING PRACTICES AND IMPROVED AIRTIGHTNESS TECHNIQUES THAT REDUCE INFILTRATION AND, CONSEQUENTLY, ENERGY BILLS, SEAL THE HOME SO WELL THAT ODORS AND EXCESS MOISTURE CAN'T ESCAPE. VENTILATION REPLACES STALE AIR, WITH ALL OF ITS CONTAMINANTS, COMBUSTION AND CHEMICAL BY-PRODUCTS, WITH CLEANER OUTDOOR AIR.

In addition to contributing to good indoor air quality, mechanical ventilation also contributes to moisture control. Everyday activities, like cooking, bathing, doing laundry—even breathing—create a great deal of moisture. If the house is so airtight that excess moisture can't escape, the level of humidity will rise, potentially creating an unhealthy breeding ground for mold and mildew. A combination of good source control, dehumidification, and mechanical ventilation can help control these issues.

In Northern winter climates, humidity passes into the wall and roof structure by moving through holes around electrical and mechanical connections, and by diffusing through the wall surfaces. This moisture can condense in the wall and roof system, wetting materials and creating conditions conducive to mold growth. When outside, drier air is introduced through ventilation, the average moisture content of the air is reduced, and the possibility of wetting is decreased, thus reducing the potential for mold growth.

In an airtight home, mechanical ventilation delivers a controlled airflow. Through a properly designed system that tempers incoming air, fresh air is introduced into the home at a comfortable temperature. This contributes to overall indoor comfort levels and reduced energy use because additional heating and cooling is not required.

But let's be realistic. Implementing an effective mechanical ventilation strategy isn't easy. First, trades often have difficulty installing new systems (in fact, about 80% of the ventilation system installations we've seen in the field have been faulty, including simple bathroom vent fans). Second, consumers often misuse the systems. Faulty installation and consumer misuse counteract the benefits of a properly functioning system.

Additionally, implementing ventilation systems without a well thought out strategy has the potential to increase energy costs, and decrease customer comfort and satisfaction. Why? Because the introduction of fresh outside air through an improperly designed system can increase the heating or cooling load of the house and cause uncomfortable drafts and, possibly, increased moisture.

On the other hand, the headaches associated with proper system design, product selection, and trade training/consumer education are nothing compared to the risks you encounter if you don't ventilate at all.

While there's no simple solution to preventing poor indoor air quality, whole house ventilation, following a deliberate ventilation strategy is an excellent place to start.

IAQ WHO?

With asthma and allergies on the rise, new consumer education initiatives, and loads of press about "sick buildings," consumers are starting to understand the need for better indoor air quality (IAQ).

And rightly so.

The American College of Allergists estimates that 50% of illnesses are caused by indoor air pollution.

Additionally, building code is beginning to require mechanical ventilation in several states. Many housing programs such as Building America, Health House, Energy Star® and Super Good Cents already require it.

A properly designed ventilation system is critical to contributing to good indoor air quality. It also contributes to a good moisture control strategy, which is imperative to have in place to help control indoor air quality, among other things, like the new four-letter-word: mold.



IBACOS



2214 LIBERTY AVE PITTSBURGH, PA 15222 412.765.3664 • WWW.IBACOS.COM

ABOUT US:

Since 1991, IBACOS has worked in the field to enable builders to consistently design and build homes to higher standards of performance and quality, and in the lab to define and develop the process and system technologies to achieve this goal. We provide the tools and resources necessary to build better homes.

IBACOS' Quality Home activities are supported in part by the following organizations:

U.S. Department of Energy's Building America Program
www.buildingamerica.gov

Andersen Windows
www.andersenwindows.com

BuildIQ
www.buildiq.com

Carrier Corporation
www.carrier.com

GE Appliances
www.geappliances.com

Owens Corning
www.owenscorning.com

USG Corporation
www.usg.com



ABOVE, CLOCKWISE: WASHINGTON'S LANDING, PITTSBURGH, PA. QUALITY IS IN THE DETAILS. IBACOS' INNOVATION CENTER, PITTSBURGH, PA.



ENERGY EFFICIENCY PAYS OFF FOR HOMEOWNERS AND BUILDER



THIS HOUSE BUILT BY HEARTLAND HOMES IS A MODEL OF GOOD ENERGY EFFICIENCY.

Urich and Deanne Bowers were elated this winter when their actual energy use was significantly, and consistently, less than the amount the utilities estimated. In fact, the actual energy cost each month was approximately half of what the utilities estimated.

The Bowers bought a house near Pittsburgh, PA constructed by Heartland Homes as part of the Department of Energy's Building America program, which advocates building quality, high-performance homes. One of the goals was to increase energy efficiency.

The reduced energy bills were a clear indicator that this goal had been accomplished. Now advocates of energy efficiency, the Bowers have recommended that other home buyers pay particular attention to energy efficiency aspects, like checking the specifications of the furnace, air-conditioning unit and windows.

The substantial energy savings isn't the only benefit. Their house's location is prone to extreme wind conditions, yet very little air infiltrates inside because of the superior airtightness work. Also, the finished basement has had a noticeable effect in preventing drafts.

These quality aspects have so impressed the Bowers that they would recommend Heartland Homes to others. "They definitely build a quality home," said Mr. Bowers.

"We have discovered, as a company, that education and inspection of systems are often the keys to saving energy without significant upfront expense. We have been able to thoroughly understand how our homes perform and that makes us a better builder."

JEFF AKIN
WEST REGION PRESIDENT OF JOHN WIELAND HOMES