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Don't Finish Your Basement...Until You Read This

By Jason Earle

Due to popular demand, I have been forced to sit down at my computer and put to paper my mold prevention ideas and concepts that apply to finishing basements and other sub-grade living spaces.

First, let me say that if you are reading this you are head and shoulders above the mass of the population that will haphazardly sheetrock and carpet a basement without concern for the inherent problems that traditional finished basements are known for within my industry. My only concern is that the ideas contained in this article gain wide acceptance and my revenue decreases dramatically. If this occurs, I will gladly accept generous donations from the happy applicants of the wisdom contained herein.

Few of these ideas are original. The true value of this short piece is to shine the light on the choices you have as you endeavor to add very valuable space to your home.

If done right, a nice profit and many enjoyable years can grow out of your healthy, well-designed basement. If done wrong or without proper attention to the crucial details, other things will grow out of -- and in -- your basement. And you won't like that. That's why you are reading this. So let's proceed.

Let's start with a brief course in mold. Mold 101. Here's all you need to know for now.

Mold spores are like microscopic seeds that are constantly floating around in the air. In fact, unless you are highly sensitive or there is a large concentration of spores as a result of a mold growth problem near where you are now sitting, the air you are now breathing contains mold spores that are probably not bothering you in the least. Mold spores are literally everywhere; on your clothing, your eyeglasses, the face of your watch, your kitchen table. This is unavoidable. What we really want to avoid is mold **growth**, not mold spores since mold spores are, in fact, unavoidable.

Why do you not want mold growth in your house? In a nutshell, here it is:

1. It stinks
2. It ruins your stuff
3. It can make you and your family sick
4. Other nasty stuff likes to join the party (i.e. dust mites, spiders, bacteria, amoeba, nematodes)
5. You may end up having a hard time selling your house

Mold growth occurs when a few specific factors are present. In fact, part of the problem is that these factors are very often present indoors because mold loves the same conditions we do, with few exceptions.

1. Moisture/water
2. Oxygen
3. Comfortable temperature
4. Nutrition/food source (cellulose, i.e., drywall, ceiling tiles, wood, carpet, etc.)

Of all of the above factors, moisture is the most easily controlled. In fact, few of the other factors are easily or cost-effectively dealt with. So, control moisture you must. Moisture control is the mold-prevention mantra.

Also at play is the type of building materials and the way they interact and integrate in modern construction. The way we have built and continue to build homes since the 1970s energy crisis, and what we build them with, makes it very easy for mold growth to occur indoors. Most builders use low-cost materials, over-insulate and insist on putting basements into buildings built in areas with poor soil drainage or high water tables. One of my mentors is fond of saying that we now build self-composting houses – just add water!

When it comes to finishing basements, you have more choices and – at the same time – more problems. Since it is a much smaller space than the rest of the structure, you can spend more money on the specialized building materials that resist moisture and mold growth. At the same time, the added cost can sometimes make it more expensive than it's worth for some homeowners. For example: Dens-Armor Plus by Georgia-Pacific, a fiberglass-faced gypsum board with no mold-friendly nutrition source for the mold to grow on is at least 2x the cost of normal ½" paper-faced drywall gypsum board. In fact, many of the solutions are twice the price but worth every penny. The way I figure it, you can spend twice as much once and do it right, or you can do it wrong and spend half as much, but end up doing it twice. The first choice is must easier, and you don't have to pay a mold remediation specialist a small fortune to gut your basement and a remodeler to rebuild it all over again. Look at the savings!

In addition to donations, I accept Thank You cards. This means you can thank me for saving you tons of money in advance. **Tons.** I really like the Thank You cards. I still prefer donations though.

Moving on.

Here are the primary ideas and guidelines to follow:

1. **Stop the water:** If you have a damp basement or get water sometimes, you **MUST** do whatever is necessary to fix it before doing anything else. A dehumidifier is NOT the silver bullet. If you can, you should do whatever you have to do to prevent the water from coming into the basement in the first place. This can sometimes mean excavating outside, fixing cracks and

sealing the foundation properly (Big \$\$\$\$). Although still expensive, some people install French drains (see more on them later) and sump pumps with battery backup units. This can be helpful but, again, it is not a silver bullet all by itself. You may find that something as simple as re-grading outside, covering window wells or extending the gutter downspouts further from the foundation is enough. You may find that some combination of these may work. In any case, do what you must. Otherwise your allergies and your wallet will suffer.

2. **Monitor the humidity with a digital humidity gauge** otherwise known as a hygrometer (available at Radio Shack, Lowe's, etc. for about \$20). Keep your humidity at 45% or below. In fact, you should do this in the other areas of your home as well. Maintaining a moderate humidity in your home is one of the most important things you can do to keep your home healthy and help prevent mold growth, dust mite proliferation, and a whole roster of other nasty stuff. In the basement, do not even think about finishing it until you get a handle on the humidity.
3. **Insulate all cold water pipes** to prevent condensation. When possible, insulated ducts are a great idea too to prevent condensation from accumulating on the ducts in the ceiling when the air conditioning is running. But this is not always practical.
4. **DO NOT PAINT YOUR WALLS WITH DRYLOK OR WATERPROOFING PAINT.** Concrete does not support fungal (mold) growth. Paint does. Even most antimicrobial and antifungal paints and coatings will eventually grow mold if the conditions are right. Also, do not attach insulation directly to the foundation walls. It behaves as a moisture trap and can also hide structural problems and cracks in the foundation. Bottom line: basement walls need to breathe too.
5. **How 'bout a little elbow room?:** Although this is sometimes impractical and you can lose a lot of square footage, building the wall at least 18 inches away from the foundation gives you permanent access to your foundation and allows enough air movement that ventilation and dehumidification can work together to the fullest. Also, if you ever need to perform any repairs to the foundation, it can be done with little additional cost and destruction. It also makes upgrading wiring, plumbing, sound systems etc. much easier and less expensive.
6. **Use metal studs** or, if you use wooden studs, make sure to put in a pressure-treated sill plate. As a rule, untreated wood and all porous and absorptive building materials should never be in direct contact with concrete. A concrete slab and foundation can contain thousands of pounds of water and will gladly transfer that moisture into anything porous and absorptive it's in contact with. Once the moisture gets in and stays, mold growth and, eventually, rot are inevitable. So keep wood, drywall, carpet, carpet padding, tack strips, etc. away from direct contact with concrete.

7. **Insulate properly:** Although some building code officials do not like rigid insulation, it is a preferred material for moisture-prone areas such as basement. Unlike traditional fiberglass batt insulation that you will find in most attics and wall cavities, rigid insulation will not absorb water. Also, rigid insulation contains no nutrition to support mold growth but the paper backing on many kinds of fiberglass batt insulation does. Building code officials don't like rigid insulation sometimes because in the event of a fire, the gases are deadly. So if that scares you or your local building code official too much, then fiberglass batt insulation is your best bet. Johns Manville makes a Formaldehyde-Free fiberglass batt insulation that is great for families concerned about indoor air quality. You'll know you've found it because it is white, fluffy and encased in plastic.
8. **Heat and air condition the basement** just like the upstairs. Consult with a NASE certified HVAC technician to prevent losing heating and cooling efficiency upstairs.
9. **No carpet. No hardwood floors.** Ceramic tile is the preferred choice. Pergo is often recommended but I have my reservations. Pergo, as with all laminate flooring, is made by taking fiberboard planks with decorative laminate sheeting around it. The fiberboard inside is a favorite on the menu mold likes to eat from most. If you insist on carpet don't overspend, seal the slab with an epoxy-based concrete floor sealer, use no carpet padding, and install Dri-Core (www.dricore.com) or Sub-Flor (www.subflor.com) raised-floor systems on the slab. Then put your carpet over the raised floor system. If you flood, for whatever reason, the carpet will need to be professionally dried within 24 hours, or it is garbage. Period.
10. **No drywall on exterior walls.** This includes "green-board", "blue-board" or any paper-faced gypsum wallboard. All of it will get moldy in a wet environment. On exterior walls, Dens-Armor Plus by Georgia-Pacific is the only way to go. It has no mold-friendly nutrients and is just as easy to work with as standard drywall. At this writing, the only problem with Dens-Armor Plus is that it has a slightly different surface texture when compared to traditional drywall. It requires more primer and more paint to even out the surface. When I called Georgia-Pacific to ask them about this they assured me that they are working hard to remedy this.
11. **Get it up:** Regardless of the type of wallboard you use, keep at least a 2-inch gap between the bottom edge of the wallboard and the slab to prevent wicking in the event of water intrusion or release. Use molding along the bottom to cover the gap for aesthetic reasons. Do not let the drywall touch the foundation walls either.
12. **Get exhausted:** If bathrooms or a kitchen are part of the plan, exhaust fans vented to the outside are a must.
13. **Stuff it:** Anything stored in the unfinished areas should be in Rubbermaid containers or, at least, up on shelves.

About French drains:

1. If you think you have a French drain, you might. But you probably don't. Most people were told when they bought their house that the gap between the wall and the floor around the perimeter of the basement is a French drain. A vast majority of homes that have this gap where the floor meets the wall actually have something called a "floating slab". It was designed that way for a few reasons. 1. The gap allows for a very small amount of water to collect in the gap and not get onto the floor. It should eventually drain, but VERY slowly. The problem is there is no pitch or slant for the water to follow and so the water just sits there and then, most of the time, evaporates creating high humidity or allowing the random debris in the gap to get moldy and decompose; neither being a good outcome. 2. It allows the floor to "float" slightly and prevents the cracking that may result from excessive vertical pressure from rising water under the floor. 3. Every state has different laws regarding warranties for new home. Homes in NJ come with a 10-year structural warranty and a 1-year water guarantee. This perimeter gap conveniently keeps the water off the floor long enough for the warranty to expire and the builder to get off the hook.

A French drain can be used inside or outside. They were developed in 12th-century France – hence the name – to deal with pooling and rainwater run-off. Much like the Northeast here, they have a lot of clay and, as a result, poor drainage. A true interior basement French drain contains a few elements. There are many bells and whistles but the guts of it remain the same.

1. Perforated pipes and gravel under the floor around the perimeter that are pitched towards the sump pump pit.
2. The pipes terminate, or drain, into a pit
3. The pit has a pump capable of ejecting the water out and away from the building

If you want to know whether you have a true French drain or not, this requires some investigation. Here are a few questions to get answered:

- a. Can you see gravel or stones in the gap?
- b. Do you have a sump pump pit with a working pump and pipes that drain into the pit?
- c. If you pour water into the gap, does it disappear quickly no matter how much you pour in (think: garden hose full-blast for 10 minutes)?
- d. Does it make it into the sump pump?
- e. Can you see a "scar" around the perimeter where it looks like concrete was removed and replaced?
- f. If you have a concrete or cinder block foundation, are there holes drilled into the block walls all the way around the perimeter that allow for the cells/voids within the walls to drain into the gap?

If you answered "no" to more than a few of those questions you probably have a floating slab. If you want confirmation, open your

phone book to Waterproofing and call a few of them to come and take a look. Be prepared to endure a sales pitch and sift through the B.S. But you should be able to find out what kind of drainage you have...or need.

2. If you have a sump pump, a battery backup unit is a must. Just think, when do you lose power? During a thunderstorm or hurricane, right? When do you need a sump pump most? Exactly.
3. Make sure that the discharge from the pump goes far enough away from the house.
4. If you get an interior French drain installed or are willing to add to your existing one, a round floor drain tied into it is a great idea especially in the middle of the floor, in the bathroom, or anywhere else that flood and spills are probable and likely.
5. This one will make my friends in the waterproofing business hate me, but you will love me for speaking the truth. Most installers are crooks. Check the BBB and call at least 3 references. Get an insurance *binder*, not an insurance certificate, with your name and address on it BEFORE the work is started. Do not give more than a 10% deposit and make sure it is refundable if they fail to deliver the insurance binder. Get everything in writing and go with your gut feeling. You will probably be right.
6. It is often a high-pressure sales pitch so put on your thick skin and don't fall for the scare tactics. Most of the systems are so similar in design that the main variable is the quality of the company. Since what you are really buying is a warranty, make sure they will be there when the system leaks or the sump pump fails. Both will probably happen at some point.
7. If you really still feel confused...call me.

Oh, and good luck. Remember my first piece of advice...don't finish your basement.

But if you insist, at least do it right.

Jason Earle
Lab Results LLC
66 Witherspoon Street, #378
Princeton NJ 08542
800-630-9047 ext. 711
<http://www.StopMold.com>