

Hot Topic #1: Diagnosing The Cause of a Damp or Wet Basement

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Don't panic that your basement is wet or damp. This information will help you become a Sherlock Holmes so you can determine the cause. It is good that you are concerned because a damp basement can lead to mold and wood rot. A wet basement, where water comes through the walls, can lead to the collapse of the foundation and the building.

I'm sure you've read articles discussing the health issues and seen TV shows with instances of damage and collapse due to a wet or damp basement. I won't get into that discussion here, but I suggest you research the subject. State and Federal web sites have information on the subject as well as DIY Network, HGTV, and many of the home improvement magazine web sites.

But beware! There are some contractors that use fear to sell you an expensive remediation project when a simple, much less expensive solution is available. This alternate solution may even be better and directly eliminate the cause. You may even want to do the work yourself and save a bundle of money.

This article is based on my four decades of building experience as the owner of construction and development companies. To find out about my background, go to my Web Site www.thediycoachusa.com and click on About the Founder and More About the Founder articles.

Your problems may require a different solution than what is discussed here because your situation may be somewhat different. Therefore, we disclaim any and all responsibility for your use of my methods.

There is much written about the subject and I strongly suggest you learn more before attempting a solution. One of the sources that you can use is "The JLC Field Guide of Best Practices-Volume 1". Pages 66 to 73 have many illustrations about damp proofing, waterproofing, and foundation drainage. On other pages in the book are illustrations about foundation construction.

This article is a summary of the conditions and remedies that I have seen and the solutions that I used in solving basement problems. I am hopeful that this will be your beginning to develop a basic understanding of this issue. It is beneficial for you to be informed so that you can evaluate a plan of attack that's in your best interest, whether it's developed by you or one that is offered by a contractor.

The most frequent causes of wet and

damp basements that I have seen are exterior grading problems that direct the storm water toward the building, capturing the storm water that comes from the roof and possibly the exterior building sides. Be aware that the sides of a house, in a driving rain, can collect as much water as two-thirds to three-quarters per square foot of the surface area of the roof. In new houses as well as old, all grading should be substantial enough to move the water generated by even severe storms away from the building.

Plant and flower beds should be built so that the soil level and the mulch level perform as above. I've lost count of many times that a homeowner who I built a house for ignored this important rule as they developed their planting beds and gardens. In fact even my wife, who has become a terrific gardener over the last fifteen years, had to learn this and in turn has taught neighbors. People often hired a landscaping company who set grades wrong. The result was the basement became wet or damp through no fault of the builder. In many cases, the garden beds next to the house were mounded on all four sides and the roof leaders were delivering storm water in large amounts that were trapped up against the foundation in addition to that which was generated by the sides of the house. I have solved many wet basement problems by correcting the grading problems that relate to storm water runoff.

Rule number one: Visually check around the outside of the house for areas that trap water against the foundation. In a mulched bed, whether the material is stone, bark, or wood chips, make sure that the underlying soil is higher than the lawn or adjacent hardscape in front of it (such as patios and sidewalks) and that it pitches away from the house. Yes, you may have to raise the beds and replant everything in them. As part of rule number one, determine if leaders are properly pitched and are extended sufficiently to empty roof water away from the house. Ask yourself the question: has an island planting bed interrupted the flow of storm water and changed its path so that it flows toward the house?

A recent solution to this type of problem, in a older commercial building, was to remove large raised planting areas that were part of a beautification project two years earlier. The hint was when the owners wife, after questioning, realized that the problem appeared in the basement of this forty-five year old building

a few months after the project's completion. They had a handyman service install several sump pumps before they called me, but water was still coming thru the walls, ruining the sheet rock, helping mold grow, and eliminating usage of the space for tenant storage. Eureka! The removal of the beds and replacement with flower pots ended their wet, damp, and moldy basement. (By the way, they've told me that the sump pumps installed by the handyman never go on anymore.) Rule number two: Use a builders optical or laser level to develop a rough topographical map of your property to determine if there are any low areas within twenty to thirty feet of the building that traps water that could leach underground back to the house or may throw water toward the house in a storm. Use observation for the same purpose after a rain. Spongy areas in your yard are a symptom. Re-grading or installing an area drain or a combination of both may offer a solution.

Before I go further, let me answer a frequently asked question that will help you understand some things later. What is the difference between waterproofing and water resistant coatings?

Water resistant coating or damp proofing on a foundation is the minimum standard required in most building codes. Think of it as an asphaltum or tar based liquid that is painted on the foundation in two coats that helps a masonry foundation's walls resist water penetration under minimum hydrostatic pressure. It is relatively inexpensive.

Water proofing is a rubberized or tar coated membrane with an adhesive back, that when installed properly on foundation walls, it forms a seamless impenetrable water barrier that can stand up to a substantial amount of hydrostatic pressure. Very often, it is part of a system that provides drainage of water against the wall into a foundation piped system below the top of the footings. It is expensive compared to damp proofing, but makes absolute economic sense in new construction after the foundation is built and before the excavation is backfilled to solve a high water table problem. When required on an existing home, it can be devastatingly expensive. I have used it in both public and private applications. In one particular case, the basement was four feet below the water table. Installation of waterproofing in conjunction with a drainage system and sump pumps enabled the basement to be used as office

and record storage space. This was a building that was located in a public park next to a lake.

Rule number three: Determine if you have a high water table. Ask yourself the following question: Is your house new or only a few years old. Is it five, ten, or more years old? When did the basement get damp or wet? Is the problem seasonal? Is the water coming through the walls, the floor, or both? A little caution here. Don't mistaken water on the floor that came through the walls as coming through the floor.

When new houses are built and the foundations are backfilled with the material that was excavated, this area of disturbance is more porous than the undisturbed area around the building. The disturbed area will usually saturate with water when it rains. Damp-proofed water resistant foundation walls could show dampness for a few years until the fill settles. In most cases, the dampness goes away. If it's a new house, under warranty, and the problem is severe enough to leave water on the floor, it should fall under the builders responsibility to remedy the situation. The exception would be if you did something such as landscaping, as mentioned previously, or a penetration through the wall that caused the problem. One of the problems that is often a cause are unrepaired settlement cracks that could fall under the builders responsibility. In New Jersey and many other states, builders are required to give you a dry basement as defined in the warranty and the covered period.

To diagnose high ground water problems try the following. If you have a sump pit and there is no water in it during dry days, you probably don't have a high ground water condition but there is a chance it could be seasonal. If you don't have a sump pit simply rent a Rotary Hammer for concrete and open one hole in the wettest corner about the size of a five gallon bucket. If you find it's dry, dig down several feet or more to see if you can even find water. Watch it through the spring when water tables are at their highest. If water does show and it's several inches below the bottom of the concrete floor you may still not have a problem that requires drastic action. It is also a good idea, since you all ready spent the rental fee, to drill a two inch hole in any other area that you may suspect. Be careful not to drill through any underground piping that may be hidden. Then observation will tell the tale. Repairing these areas will be simple if nothing shows. We will talk about typical remedies and danger signs later. I will talk about solutions to high water problems toward the end of the article.

Rule number four: O.K. Sherlock Holmes, let's play detective. I will assume that you have corrected the grading issues or have none. Let's identify things that disguise themselves as basement water

problems but aren't. Some of these easily detected things are leaky garden hose connections at the hose bib or a leaky hose bib. Look out for piping that may be leaking inside the foundation wall from when it froze and cracked over the winter or a bad solder joint right at the outside of the wall. Check for grading under low decks to make sure rain water does not run up against the foundation. Make sure it's not coming from an underground sprinkler system leak or spray hitting a wall.

If the wet area is in the area of the water main, it could be coming from several defects. The main is old and worn out outside or in the foundation wall and is leaking. Shut off the water in the house, put your ear onto the pipe and listen for running water. If you have a meter at the curb, you can look at it to see if water is running. Another indicator can be a large increase in a water bill based on usage. The same detective work can be used if you suspect a broken water line due to the foundation settling. Sometimes the penetrations of these line are improper or poorly repaired making them susceptible to leaking during storms.

Leaf clogged gutters could be the problem. Annual cleaning of the gutters and leaders should include checking that they work properly with a hose. If you want to limit your work, install some type of leaf guard to help prevent this clogging. There are many inexpensive choices that you can do yourself; there are also more expensive, patented systems that are supplied and installed by a contractor. One of the solutions that I find interesting is Flo-Free by DCi products. It's a life time product that you can purchase direct from the company and is simple enough to install yourself. It could be only one-seventh the cost of the patented metal systems when you do the installation. Many of these guards will eliminate the need for annual cleaning. If you hire someone to clean your gutters or value your time, the payback is easy to figure out. Remember that water can travel inside a wall or behind the siding, with no evidence inside the house, and appear as a basement leak.

Playing Sherlock Holmes isn't always easy, even for a professional. Here's a story about my own house. In a corner of my basement I have a sump pit; in the fifteen years that we have lived in the home, I have never had to install a pump in it. Yes, it has water in it sometimes, but at the most it was six inches below the bottom of the four inch thick concrete floor. However, I do keep a brand new pump on hand just in case a problem ever develops.

Right next to my pit is a steel paint storage cabinet, which partially hides the wall. Outside, I have a wood deck that is about 30 inches above the ground. I was very careful when I built the deck and made sure that water would run

away from the house. A few years ago, I noticed that the block wall became damp after a rain and recently that water would run onto the floor and would require mopping up a three to four foot puddle. For the life of me, I couldn't figure out where it was coming from. This fall, about a month before the winter, I noticed that the open joists above this area were dripping water during a rain storm. I mean a lot. In addition, the foundation wall was wet above the outside grade line right to the plate and down to the floor. The kitchen is above this area, but there is no plumbing there.

So what could it be? Great balls of fire Watson! What was I to do? The great Sherlock Holmes, using deductive reasoning, was about to solve the mystery. There was a patio sliding glass door above in the kitchen. It must be that I thought. It needs to be caulked with silicon. That should solve the problem and so as they say on Star Trek "make it so" and I did. The rain came and I went down into the basement to check out my solution and celebrate my genius. Holy Moly! (Does anyone know what a "Moly" is?) I was foiled again. It must be professor Moriarty at work. The area was still taking water.

I went up on my trusty ladder as soon as the rain stopped, with my calk gun in my hand. I was ready to attack the enemy with a massive barrage of calk everywhere. Then suddenly, as I was going up the ladder, I noticed a three inch piece of vertical J channel that was a little short and had slid down in the vinyl siding. I was sure this wasn't it, but fixing it was simple and I had a matching piece that I could cut to fit better. After the repair, out came my trusty garden hose. I worked my way up the wall checking the basement from time to time for water as I went. Eventually I reached the area of the repair and blasted it with the hose. No water in the basement yet. I continued up the wall until I reached the second floor soffit and roof and still no water. I still wasn't convinced this little repair could be the culprit to all the water I had seen and waited nervously for the rains to come. Well it's been quite a few major rain storms later and a record snow storm of twenty inches that has been washed away by more rain and now deductive logic would say that the case is closed. It's elementary my good man, no water! Maybe Sherlock Holmes used a lot of persistency with a small measure of luck. So what's the conclusion? You would be surprised about how many times I've looked at basement water problems, where the owner was told by someone else that they had a serious problem of a high water table and it wasn't. By now, I think that you would not be surprised and understand how an unscrupulous or less experienced contractor could try to sell a not needed solution at the expense of the uninformed home owner. There are many

honest contractors, but become informed. Be confident that you understand the problem before you take action. It could save you a lot of money.

Excessive water coming through the walls over a period of time will show up first as darkened stains. If you see a white stain or material accumulating on the wall, this is the lime in the mortar that hold things together being released. This is a sure sign that the mortar or cement that is holding the wall together is weakening. If you do not act at this point, the following usually happens. More white shows and the wall may begin to bow. You may see narrow cracks with brown staining, which is the soil behind the wall working its way through as muddy water. Cracks will appear more frequent and become larger and mud may begin to flow inside as the situation worsens and finally the displacement of the wall with the collapse of the building. Throughout this situation, mold may develop and be damaging to human health to a point of making the house unsuitable for occupancy. In a case of surface storm water being the cause, the solutions that we spoke about earlier could have prevented this at a relative small cost in comparison to the huge loss of part or all of the house. Your insurance may not cover this.

Remember that the main point is to stop the water from coming through the walls at its' exterior face. Solutions that carrier the water away after coming through the walls are not ones that I accept. Also sealing the walls inside with a waterproofing coating only partially solves the problem leaving hidden water inside the wall. In climates where the temperature drops below freezing, the development of ice can crack the wall. If there is enough pressure built up by the height of water in a hollow block wall, it will eventually seep out where the wall joins the floor. Further, there is no guarantee that the mortar and parging (outside coating of cement) that hold the block together won't disintegrate. This is especially important when you are planning to finish a basement so that if problems develop they can become hidden.

The next situation, that of a high ground water table in an existing house, is even more serious and difficult to deal with. To simplify your understanding, think of the situation in terms of a ship that is built with a hull of porous cement. The part of the hull under water is under hydrostatic pressure. The pressure forces the water through the sides and bottom at a greater rate the deeper the side is under water. The deepest part of the hull is the very bottom. If the bottom was totally flat this would become the greatest area per square ft of penetration of water when compared to the sides. Ships solve this problem by building their hulls water tight with the exceptions of some penetrations like the steering mechanism and propeller shafts that are almost water

tight. Any water that gets in is pumped overboard from an area called the bilge (an area under the lowest deck in the hull).

(Just a side note. During WWII there was a shortage of steel and some transports had hulls made of concrete. There are still universities that have concrete boat races.)

I hope that you now understand the challenge. We will now talk about the slight differences during a discussion of the solution. I also want you to keep in mind the discussion above about why it is important to keep water from coming through walls.

The first thing that we must do with an existing house is to excavate around the house to reveal the foundation to a point that is even to the bottom of the footing and control the water. I'm not going to go into the details on how this is done except that it's done carefully. Once this is done and the foundation walls are dry, we will repair any part of the masonry that's needed. A water proof membrane is installed over any foundation wall that lies below grade, including overlapping the concrete footing. A system of stone and drainage pipe is laid and very often piped to a exterior pump pit or into the basement sump pit. The choice made is based on conditions. The next step is to install a foam board that can have two purposes. The first is to protect the membrane from being penetrated during backfilling. The second is to provide a vertical drainage pathway to the footing drainage system. The excavation is then carefully back-filled and landscaped.

At this point we may have done enough and may not have to go any further. However, we could have an additional problem that causes us to take another step. Waterproofing the walls and draining the area around the footing may not be enough. Hydrostatic pressure caused by the high water table (similar to our ship with the flat bottom) could be pushing water up through the basement floor. In a few cases I have seen it lift and break the basement floor.

The answer here then must be to open the basement floor to install a underground drainage system with pumps that is designed specifically for the situation to relieve the pressure. The floor is then repaired or replaced. In some cases, this approach is used first where the water level is at the basement floor level or just below it. If you have a contractor do this work, you want to make sure he has been in business at least ten years and offers a minimum of a five to ten year guarantee and will be around to honor it.

The last situation I want to address is one that deals with soil layers of porous, semi-porous, and non-porous soils. Water can travel many miles underground based on the arrangement of soil layers. When soil conditions create a underground water condition that effects a building,

it is often called a ground water condition. It could be seasonal, intermittent, or continuous. There are many solutions to this, including the way we deal with a high ground water problem.

However it is important to know and define what the problem is. Very often we can save a lot of money by devising a way to interrupt and redirect the water away from the foundation or go around it. Sometimes it could be piercing a non-porous layer of clay soil so the water can flow into the porous soil below it. It is not unusual to find situations created by land development or a road project (nearby or at a distance) that can be the cause. It can be possible to eliminate the problem at the source.

Rule number 5: This is the most important rule and the point of the entire article. Know and understand what the problem is and the solutions to solve it. If you are unsure, find an expert that has no conflict of interest by wanting to perform the work to help to develop the solution. This person could be a builder, civil engineer, the local town building inspector or town engineer who could be familiar with your area ground water problems. Do the job right and it will save you money in the long run.

If you go my web site www.thediy-coachusa.com and click on About the Founder and More about the Founder, you will learn about my diverse background. In past companies that I owned or had an interest in, I have performed this type of work personally and supervised and trained my companies' crews. The DIY Coach doesn't actually do this work today, but I have found that many of the masonry and excavation companies that work with me are extremely well suited to perform this work as well as some specialist contractors. One of my first questions I ask is "do they sub any of the work out or is it all done by the companies' employees?" Companies that have the equipment and manpower in house, in my opinion, can be more cost effective than those that use subcontractors when it comes to the more difficult projects. In some cases, because of the cause of the problem, it can be solved by a landscaper. It is not a bad idea to hire someone to supervise their work to make sure it's done correctly. Read our past article "How Remodelers and Builders Buy Right"; it explains how to get a fair price for your project.

If you have any questions or comments about this subject, please post it. Your own experiences may add to our readers' understanding and I thank you in advance.

If you have a question or comment about this or another subject, please post it. We may answer it or make it part of a future article. I may even give call or send you an E-Mail.