

Hot Topic 2: Don't Read This Unless You Want A Great Finished Basement

(and maybe gain more value than you spend!)

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The DIY Informer

The object of this article is to give you a starting point to design and build a finished basement that exceeds your objectives and goals. It should be able to meet your current needs and be easily modified so that it can change as your needs change. Whether you are an individual, couple, or a small or large family, a finished basement can enhance your life. It can supply needed space for peaceful contemplation, individuals' hobbies, and activities that bring people together. It can be a home theater with interactive games as well as allowing all of the aforementioned purposes. It can provide a home office, extra bedrooms, live-in helper's quarters, and very often most of the uses that can be developed on the floors above. Using that unfinished basement space is one of the most cost effective ways to develop additional living space for a home owner. To sum it all up, if you feel cramped for space, it's worth taking a look at that unfinished basement first.

The purpose of this article is to put you in the driver's seat so that you can steer your project into becoming A Great Finished Basement. This article is not to give you a detailed how to do it manual; there's already is a tremendous amount of material out there. But I will give you some of my personal opinions and tips that will point you in the right direction. I am going to assume that you are contemplating a finished basement project whether you are a Do It Yourselfer, a person planning to act as their own general contractor, or are going to use a general contractor. It can even be a combination of the above. You have two major decisions to make. The first one is what you want the basement to become. The second one is the manner and by whom the project will be built.

It is important for you to understand the realities of what you spend as to what it's worth if you hire a general contractor. For those of us who are so busy that there is no time or our vocational demands make it impractical to be involved, hiring a reliable, quality, and reasonably priced general contractor may be the best way to go. This is especially true if you put a monetary value on your time. But making a decision is tough if you don't understand what your involvement is worth and how much

time is involved. Even if you're a busy person, there is an alternative if you can invest a little time.

Go to our web site www.thedycoachusa.com and look at the link titled "Cost vs. Value". (You can find it by clicking onto "9 Facts That Could Save You A Bundle". When that page opens, the "Cost vs. Value" link will be on the left.) You will find the following information that is known by professionals. The average midrange finished basement remodel in the U.S.A. from 2008-2009 cost \$61,011 and the value added at the time of resale to the home was \$44,467 or about 73% of what was spent. In the Middle Atlantic States the projects average about \$6000 more and the return at retail is about 60%. You do the math. How much is your time worth?

The reasons for finishing a basement for most families is about needs. In this article I want to add in how to get the most for your money with the possibility of getting back more than you spend. Remember, many people spend less and some spend more than the numbers given above. I want to draw your attention to the fact that how you spend your money will have a great effect on the value added to your home. It is your decision! Take the time to make it wisely. The Do It Yourself Coach's way is to make you the administrator and developer of your own project. This way your cost ends up similar to a builder's own project. That's right! There is a way to remove the overhead and profits that general contractors add on. Please go back to our web site www.thedycoachusa.com to find out how you can do this. In addition, it will explain how you can have professional results and help as you need it. Okay, that was my sixty second advertisement. Now back to your basement project.



I want to urge you to be fearless throughout the design stage. It's not that difficult. In most areas you may not need an architect, unless you are making a structural change. If it's your own home, most building authorities will accept your drawings if they meet the town's requirements. You can do this part and there is much written on the subject of finish basement designing. I'll just mention two of the many books that you can purchase or find in your public library: Black & Decker's "The Complete Guide To Finishing Basements" and Creative Homeowner's "The Ultimate Guide to Basements Attics and Garages".

Again I want to state, "it is not my intention to write about a project from start to finish". It would be a two hundred and fifty page book and I would be regurgitating a lot of material that is already out there. What I want to do is to give you tips and point out a few decision-making areas that I always go over with clients.

Important, Read This: Almost all building codes have a required minimum finished height of 84 to 90 inches from floor to ceiling. If you think you have a problem, talk to a building inspector about this. In past projects, I have lowered a basement floor, when sub soil conditions were good, six to twelve inches in the finished area. In other cases we replaced drop girders with flush girders to solve passage way prob-

lems. So don't give up. You just may need a little professional advice or relief from the building department to resolve issues.

My advice is do not begin the actual construction of a project without proper permits and approvals. The process is to protect you and the consequences can be severe fines and the demolition of the work you've done in the end. Don't let anyone talk you into this, including contractors, without a discussion with the local building authority.

I have seen cases where work done by owners had to be removed or corrected before a sold house could close or caused a reduction in price to close the sale. I was once called in to remedy leaks on the first floor of a two story residence that was caused by defects in a bathroom remodel done by the previous do-it-yourself owners. Not only was the project done poorly, it was done without a permit. The new owners were successful in recouping the cost to completely redo the bathroom, including legal fees, through litigation. In most cases, it just doesn't pay and isn't very smart to avoid the system.

The first step is to know what you have. You can purchase what is called "Cross Section" 17"x22" or larger non-reproducible layout bond paper pad in most art or drafting supply stores. One of the neat things about this graph type paper, that is divided into 1/4" and 1" boxes, is that when the page is copied with a copy machine, the guide lines disappear. You will be using this to create an accurate scaled drawing of your basement as it presently exists. I want to emphasize accurate. In order for you to do this you may have to clear the area that you will be working in of items that will inhibit access for measuring. I then set up a table in the basement and begin making my drawing guided by the lines on the paper while using a scaled ruler and pencil. You can purchase software to help design your project if you like, but I would still use the paper for gathering the data.

To make drawing this easier, start out by measuring and marking on the paper the basic rectangles that make up your basement using 1/4" lines to equal 1', without any of the projections or unusual shapes. Therefore at this point, any circular or angular space will be within a rectangle. The next thing I suggest you do is to determine the largest scale you can use and still fit everything on the paper, leaving space on the outside for notes. Then transfer to drawing to a new sheet of paper using the larger scale. It is now time to mark any projections from the wall (such as piers or pilasters),

layout the circular or angular areas, then mark out the locations of all columns, placement of girders, stairs, and the direction of beams. The final step in the as-built drawing is to confirm what you've done, make any changes needed, and mark the measurements on the drawing. If you have done this in pencil, it will be easy to change. When I reach a point that I'm confident my drawing is correct, I go over the lines in ink.

At this point I make several copies (called a print) of what has been done. If your printer doesn't have the capacity to make copies, you can use one of the copy services. Call first to make sure the copy service has a machine to handle your size drawing.

On the first print, I locate and draw in all the areas that are occupied by mechanical equipment such as hot air furnaces, hot water boilers, hot water heaters, water and gas meters, main and sub-panel electrical boxes, any ducts below the ceiling joists, and the location of all water shutoff valves and sprinkler equipment. I also locate and note sewer and waste line locations that are along the wall or rise from the floor and where they exit the walls. I will also make a tracing of these items, as an overlay and aid when I begin the design. I then put the drawings aside and move to the second step. In many cases, when my clients don't have the time to do this, I do it for them.

The second step is project planning and objectives. Go to our web site www.thediyoachusa.com and read the articles under the subject. Simply put, you have to determine how the space will be used and your order of priorities. Decide how much you want to spend on the project and what special areas will be needed and the amenities that are desired. Depending on how you will use the space, some of these items may be: storage and closets, bathroom, exercise area, work/craft shop, kitchen and bar area, fish tank, and so many things that there is not enough room to list. The important thing is to know what is most important to you. This way if you need to limit cost you can remove what is less important or plan to do it later. Never go over your spending budget without thinking it through for a few days.

One of my methods of designing is to use a copy of a print and layout what I want to include in the way of equipment, furniture, cabinets, book and display cases, bathrooms, etc. An easy way to do this is to cut pieces of graph paper to the scale of the item. Let's say you want a ping pong or pool table area. Most of the manufacturers of this equipment or the retailers that sell it can give you the minimum space requirements needed to

surround the item. With your scaled cut-out, it will be easy to determine where the best location will be by placing it on your drawing. Designers often say that we should design for function. You can read more about this in the books I mentioned. However, even if you need professional help, by providing the drawing of what exists, you will save them time and you money.

The importance of design is not only to determine what you want and where, but to use it in developing a realistic budget. There are two previous articles on this blog that should help you in developing a budget and tracking costs. The first about buying right and the second about budgets and schedules.

The only basement you should finish is a dry basement. Read our previous article on the subject of damp and wet basements. In cases where remedial work was done to cure water or moisture problems, I have used companies such as Water Out to dry the basement before work began. Companies using this type of method are much more effective than any other that I have seen. Many new home builders use companies like this to eliminate moisture issues and the problems they cause during the construction process. Check out the video of this drying method at www.waterout.com as part of a solution for a situation that you could encounter.

Even if you think the basement is dry, we know that concrete is porous and water vapor can pass through it unseen. It is cheap insurance to seal poured concrete or block walls to prevent moisture from being trapped between them and the finished walls. Not doing this could lead to mold, fungus, bacteria, wood rot as well as insects, all of which are hidden out of sight. Understand and use vapor barriers where ever needed as they relate to walls and floors. Tip: Even in a relative dry basement, I use a dehumidifier to lower moisture levels and a humidistat to measure the moisture content of the air to ensure the adhesion of sealers to foundation walls.

The third Step is developing specifications. The items we will talk about are the interior sealing of concrete walls and floors, vapor barriers, insulation, framing materials, wallboard (sheetrock), and alternative wall systems and ceilings. In order to seal concrete or masonry, it must be dry so that the sealant can penetrate and lock once as a sealant and insulation is at the top of the chart. When I add in the fact that I am sealing and insulating at the same time and consider the labor saving advantages of a one-step solution that's a superior performing product, it no longer appears expensive to me.

Another method of insulating is the use of ridged polystyrene boards after using a foundation sealer and before framing. I normally use two inch thick material to achieve a reasonable "R" rating, but thinner material exists. The boards can be attached using a special adhesive and the seams are then sealed with a insulation vapor barrier tape. There are two types: (1) expanded, which is cheaper and has a lower R rating, and (2) extruded, which has a higher R rating and is more expensive. I prefer the extruded because it is tougher. The walls are then framed.

The final method I will discuss is the use of unfaced fiberglass batt insulation. You can use either paper faced or aluminum foil faced batts, however the vapor barrier will not be continuous. The point to remember here is that humidity can develop within the finished room and pass through the sheetrock and get trapped in the wall cavity. This type of insulation is installed much the same way as when used in most home construction. Fiberglass batts are placed between the studs, after framing and upon the completion of work by other trades. These trades may include in your project electrical, plumbing, HVAC and additional carpentry to install mounting blocks for cabinets, wall mounted TV, or special trim and accessories. Remember to seal foundation walls before framing and add a vapor barrier under the sheetrock of six mil plastic. In some cases people have used a combination of the ridged board type up against the foundation and the fiberglass between the studs.

I normally recommend insulating the ceiling for two reasons. The first is to help with noise; the second is to deal with heat stratification. If you heat the basement with no insulation in the ceiling the following will happen: the heat from the basement will rise up through the floor and raise the temperature of the house above to uncomfortable levels. It is similar to a two story house with a one zone heating system with the thermostat on the first floor, where the second floor rooms are hot and uncomfortable in the winter. If the basement is on its own heating zone and the heat is moving upward, the thermostat could almost continually call for heat, thus driving the temperature of the house above to a uncomfortable level. Insulation is relatively inexpensive when we consider the cost of a project and the pay back in energy saving makes sense. But what makes even more sense is the comfort and increased usability of the space. I have talked about the walls and the ceiling as it relates to insulation and will now address the concrete floor. This is

one of the tougher decisions to make. The temperature of the ground below the frost level in many areas is about 56 degrees. Concrete has the ability to absorb heat quickly. That's what causes your feet to feel cold when walking barefooted on a concrete or tiled floor. The decisions to make are based upon the following: How much does the above matter as it relates to comfort and cost? How important is energy efficiency? Will children or adults be sitting or playing on the floor? What will you use for the finished flooring material? How much use will the finished space get? How much am I willing to spend? If I was building a new house on a concrete slab or a house with a basement that would be finished during construction (or in the future), the answer is



simple. I would install 2" closed cell polyurethane foam in the board or spray foam on top of compacted stone or sand then use 6x6 10/10 welded wire mesh as part of the concrete slab in all the living areas. Where I needed to drop a basement floor to gain head room, I've used this method. The difficulty with a sound concrete floor is the cost of removing it to place insulation under it doesn't make sense.

Clients looking for the least upfront cost may elect to install carpet, vinyl, or ceramic tile directly to the floor. Based on seasonal use or living in a temperate climate, this can be a satisfactory solution. However in my state (New Jersey), most of my clients want year-round use of the space and a comfortable floor. In the past, a radiant heating system in the floor with ceramic tile was and still is a common way to go. It solves the problem, but it isn't energy efficient. Clients today however have an array of flooring materials to choose from that include engineered wood and laminate products in addition to the ones mentioned before. They are also demanding energy efficiency and a high comfort level.

There are several ways to accomplish this; I will mention two. The first is

to use 2x4s on the flat (called sleepers) attached to the concrete over 6 mil polyethylene sheeting (for a vapor barrier) with 1 1/2" closed cell polyurethane foam board in between the 2x4s. Over this is installed a 3/4" plywood subfloor. This will give you the most flexibility in choosing flooring materials and a reasonable amount of comfort. It can even be installed with radiant heating. In garage or extremely deep basement conversions, I have also built decks similar to the floor above which has many advantages and performs a similar purpose.

The second method is to use interlocking subfloor panels over a pre-leveled concrete floor. There are several ways to level a floor including grinding if there are only a few high spots. I have very often used a self-leveling material that can be poured on in a semi-liquid state to solve floors that had variations up to two inches. This method will give you a better comfort level than just installing a floor over concrete. Check out the books I mentioned for more information on the subject. Make your decision based on your objectives and use of the space. If you're unsure, ask a professional for advice. In these decisions, the least costly method, if it limits your comfort and use, can be looked at as being the most expensive based on your total investment. Before making a decision, go back to your objectives and goals.

The next specifications I want to help you decide on is wall construction. In the last few years, panelized basement wall systems have come on the market that were only available through franchised dealers. However recently, other manufacturers have come out with similar products that are available through material suppliers. It is not something you are going to find in a big box home improvement store yet. These systems feature removable fabric or other material covered panels that are installed in tracks. They remind me of office cubicle panels. The panels are resistant to mold and moisture and have some insulation value. Since these systems are fairly new to the market, it is hard to tell what the return is at the time of selling. I have heard from the vendors and manufacturers that it is good. From realtors, I've heard that it may appeal to some purchasers somewhat, but that most of their clients want the basement to look like the rest of the house.

In my opinion, the pros are that they provide a tough surface that is reasonably cleanable for playroom use. They are removable for access behind them and have built-in resistance for moisture problems. Because each panel is every

four feet or so, they require a vertical seam that is trimmed with a molding strip; you will have to like the look. The cons are that they do not look like the rest of the house. You do not have the same flexibility of interior design as it relates to trim moldings, wall finishes, and built-ins. The insulation choices are limited and the panels are expensive. Many of my clients feel it has an institutional look; they are not looking to relax in a place that looks like where they work. The most important factor for me is their difficulty of building in the wow factor that maximizes value and use. Even though you will hear realtors tell you how important kitchens and baths are, they can also tell you stories of how a great finished basement has sold many homes. However, I do not want to discourage you from looking at these systems because it may be just what you're looking for.

If you don't use a system like above, you're left with what has been used for a long time: framed walls. I don't believe in furring out walls (attaching wood strips directly to the foundation walls) in most climates. The reasons are that wood doesn't get along in direct contact with concrete, the piercing of the wall through attachment, the lack of a thermo break between the foundation and the finished wall, the difficulty in moisture control, insulating, and the installation of the mechanical and electrical trades. It's the cheapest way and you get what you pay for, including little value at the time of selling.

One type of material that is used for framing is wood. This is usually 2x4 studs on top of a pressure-treated plate with either one or two top plates. One of the advantages is that you can eliminate any contact with the foundation and the stud wall simply by moving them apart. I'm not going to go into the details of construction, but this method gives you excellent wall strength and great flexibility of design. Tip: Remember to install extra floor plates if you're raising the floor with sleepers for base molding and install blocking for crown molding and things that will get attached to the floor. If you solved your moisture issues or have none, wood has few drawbacks and is sturdy. Once it equalizes its moisture content with the surrounding environment, it will react as the rest of your house.

If you have seasonal movement in your house due to interior humidity changes, steel studs could be a good choice.

They have become popular due to the rising cost of lumber as well as being fire and insect proof. In addition, they are light weight, rot resistant, and are always straight and uniform. For non



load-bearing use, they come in 25-gauge and 20-gauge studs. I strongly recommend using the heavier 20-gauge material for a sturdier wall. Again, I won't go into the how details of using this material, but here's a tip: Make sure that you block as you would for the wood studs above and strengthen areas such as door openings, archways, and walls that will carry weight. It is also important that electricians, cable installers, and plumbers use plastic grommets as their work passes through each stud. This will prevent the galvanic reaction of copper or the cutting of lines that could lead to electrification of the wall or water leaks. You're at a point now that the frame is completed. All the in wall work is done and you have to cover it up with something. When I speak to an audience, they always come up with the half right answer of sheetrock, gypsum board, or wall board. For most of us, they are the same thing. What also needs to be added to your specifications is the thickness and the type. There is the standard white board, then water resistant blue or green board, and the recent water and mold resistant yellow board. For most of the walls and ceilings, I specify 1/2" thick yellow board in basements. The cost is about 50% more than white board, but sheetrock is relatively inexpensive. In any wet areas around tubs and showers, we use a cement based tile backer board. We will also use this material above base cabinets in areas behind sinks that are going to get a tiled backsplash. I also recommend cement board product in the installation of stone or brick veneer. Because the applied surface material will not have a layer of paper between it and the surface that it will adhere to,

the mastic used will create a stronger bond. By using the right materials and the best methods, the chances of you facing problems from moisture become considerably lessened.

The next specification you will develop will be what the ceiling material will be and the manner in which it will be installed. For discussion purposes, I am going to assume that whatever material and method that we use will be able to meet the building code requirements including ceiling height.

The most common ceiling material that we use for ceilings in our homes is called drywall or sheetrock. Its material costs are relatively inexpensive and experienced drywall finishers can produce a very nice ready-to-paint surface. Because of the location of mechanical, plumbing, and electrical wiring, additional framing or the rerouting of lines may be required. You will also have to provide access to such things as plumbing shut off valves and electrical junction boxes. With a little imagination, this access can be made to be decorative or fade away into the ceiling. However with the use of moldings and other types of ceiling finishes too numerous to mention, you can create an impressive amount of texture and architectural detail which can enhance the value of the project.

If the above is impractical or costly due to code requirements for access to the systems mentioned above, either all or part of the ceiling can be a suspended ceiling with standard or acoustic tile. There is a wide array of styles, where you can select different performance criteria that includes insulating, fire, and sound deadening values. Because

it is suspended, it can be adjusted for uneven ceiling beams easily. Just as a side note: sheetrock can also be adjusted for uneven ceiling joists and have added sound containment by the use of a narrow metal track that is attached underneath and perpendicular to the joists. The sheetrock is then attached to these tracks (called channels) that float, which provides an air space to limit noise as well as flatten the ceiling. The final specification is the one that I think is the most important. If you have a walk out basement, this requirement is eliminated. If most of your basement is below ground level, it's not. If not, you will need a means to escape in case of fire in addition to the stairs to the floor above. In some local building codes, this is not a requirement unless there are sleeping quarters in the basement; however in areas that have adopted the International Residential Code, this additional exit is required. However in my opinion, if you have finished living space in a basement, a second means of escape is crucial for safety. Imagine this nightmare: the kitchen above has a fire. It rapidly spreads and the entrance to the basement is in flames. The floor or ceiling above is collapsing and blocks the entrance even more. Maybe at some point the stairs collapse. The only way out of the basement is through small windows that were meant for ventilation and are either difficult or impossible for people to fit through. In order for people to escape, the firemen must enlarge the window opening, if they arrive in time. Need I say more.

I do not want to count the number of people who died in a basement during a fire. I would not want to be the DIYer or owner that hired a contractor and failed to file a permit. Maybe they wanted to avoid an additional tax assessment or start the project quickly. Imagine how you would feel if there were children and family members that were hurt or died because the project didn't meet code.

In builder's terms, we call this ability to get out egress. In addition to the safety issue, we can also explore some other benefits such as increased natural lighting, fresh air access (natural ventilation), and direct backyard accessibility. The construction details are easily found, so I just want to address the benefits.

Bringing in natural light is a important consideration. The use of larger egress sized windows, where the minimum operable opening is 5.7 sq. ft. with at least 20 inches of clear width and 24 inches of clear height, can be used in more than the one required area along with an egress window well to enhance

the interior environment. I have even developed sub grade garden areas. The important thing to remember is to develop a method of handling the storm water. When done well, it will give your finished basement the feeling of being above ground. Fresh air and natural light will not only provide a level of comfort, it will save energy.

The addition of an exterior stairwell with bulkhead doors (the brand name Bilco is very often used to describe these) can increase the usefulness of a finished basement substantially. Besides building the stairwell in place similar to the rest of the foundation walls, there are companies that make prefabricated concrete units that can be set in place. Bulkhead doors are designed to keep water out, but they aren't very energy efficient. I normally create a entry way area at the basement floor level and install an exterior twin door unit to stop drafts and insulate the finished area from the outside environment. The twin door unit, with its increased width, facilitates the ease of movement for people and large objects that you may want to bring in or out.

I want to add for your consideration a design feature that I am seeing more and more frequently. In houses where the basement stairs' location is in a foyer or similar location, we have removed the door going downstairs and some of the walls, creating an open stairwell. This is being done in both one and multi-story houses. If privacy or noise control is an issue, we create a foyer in the basement with doors leading to other areas. This design flair seamlessly ties in the living space in the basement. The area is no longer cut off from the rest of the

house by a closed door and the stairway integrates a spacious entry with fully integrated use of the space below. Some of the items that you will address as you develop your plan (such as climate control, cabinets, appliances, bathrooms, lighting, type of windows) will be addressed in future articles. I will talk about some of the considerations when deciding on heating and cooling systems soon. However my next article will help you toward a "Great Kitchen Remodel". I'm sure you can see the overlapping of products.

For now, let me say this: research carefully what products will fulfill your needs and have alternatives in mind. Develop a plan that will meet your needs now and in the future. If you are a little lost, you may need professional help. This way you can provide for what will be needed later without throwing away what you are doing now. The plan that you develop should be able to be initiated in phases, so that each phase can stand on its own. This way you can build you project as it is needed and as spending allows. From an investment perspective, the project should be in line with your neighborhood and the value of your home. Overspend if you want, but realize that it is because you want it and don't expect the full cost to be returned when you sell your home. When I work with a client, we spend a lot of time in developing plans and specifications to formulate the cost. Please read the two earlier articles in the blog that deal with buying and budgets. The worst thing that a home improvement project can do is have a surprised ending when it's a negative effect on your finances.

