Bob Yapp's
About Your House
Creating Practical Historic Preservation Solutions

Myths About Insulating Old House Walls

Submitted by **Bob Yapp** on Sun, 06/07/2009 - 2:48pm

I was recently chatting with a neighbor who asked, " We love our 100 year old home. However, it sure is a drafty old place! We're interested in blowing insulation into the walls, what do you think Bob?"

Let me start by saying, if you live in an old house you are part of a large group of plaster dust lovers. I have great respect for and kinship with people choosing to live on tree-lined streets full of unique old homes with character.

Having said that, it's time for an old house reality check. If your goal is to continue loving your old house, make it energy efficient while keeping your costs down, then you absolutely ***don't*** want to blow insulation into the sidewalls.

One of the top reasons for exterior paint failure, termites and structural damage to old houses is loose cellulose or fiberglass insulation blown into the sidewalls. "Hey, wait a minute Bob, if we can't insulate the sidewalls, how can we afford to heat our old house?" That's a valid question but you need to think of air movement in your house as if the house were a chimney. Heat loss primarily happens in an upward movement. So, I want you to insulate your attic space to an R-38 with eave ventilation. You should also friction fit craft-faced (paper faced) fiberglass batting- insulation or foam board into the box sills in your basement (the area where the beams or floor joists rest on top of the foundation). The craft face acts as a vapor barrier and should face the inside.

Most building codes today require that when a new house or addition is built in a northern climate, it must have a vapor barrier. When a new house is going up, they frame the sidewalls and install exterior sheathing. The next step is to go inside and install fiberglass, batting insulation between the 2" x 4" or 6" studs. Before the drywall can be installed over this wall, 4 mil thick plastic sheeting must be laid over the insulation on the entire wall. That plastic sheeting acts as the vapor barrier.

We create warm moist air in our homes by cooking, taking showers, having plants, breathing etc. That warm, moist vapor is attracted to the exterior walls. This vapor enters the wall through hairline wall cracks, outlets, switches and window trim. In new construction, the plastic vapor barrier under the drywall stops the wet air from getting to the insulation and condensating.

In old houses with plaster walls, there is no vapor barrier under the plaster so the wet air hits the insulation and condensates. This wets down the blown-in insulation making it a wet mass at the bottom of the wall cavity creating an inviting place for termites and dry rot. Then the moisture enters the exterior sheathing and wood siding causing permanent exterior paint failure. Since the homeowner, for some "unexplained" reason, can't keep paint on the house anymore, they call the vinyl siding salesman. This makes the problem even worse as you now have backer board (insulation board) and vinyl siding which in combination creates a vapor barrier on the outside of the wall that stops the free exchange of air, trapping more moisture.

The other factor that must be examined is payback. Lets say you spend $4,000 to have your old house walls insulated. In my experience you would probably save about $200 per year on heating and air conditioning costs. So, it would take twenty years to recoup the money you spent on the insulation. Results and pricing can vary and this doesn't take into account the termites, dry rot or paint failure.

I've inspected thousands of old houses with blown-in insulation and over 80% of them have this wet insulation problem.

If your house is drafty then tighten it up. Weather-strip your windows and doors, keep the house painted/caulked well, insulate the attic and box sills. This will stop the air infiltration, make you more comfortable and ***really*** save money on utilities.

For those who have already blown insulation in their old homes, it can be removed. You'll need to remove several courses (rows) of siding and sheathing from the bottom of each side of the house as well as above the windows and doors. Just pull out the wet mess, let the wall dry out for a while and re-install the siding and sheathing.

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Contact Bob

Have a question? Want some additional information? Please don't hesitate to contact me.

You can also try to create a vapor barrier with special interior, vapor barrier grade paints. The effectiveness of the paints is severely limited and you'd still have to caulk all the window trim, outlets and switches. If you do this you'll also want to take the 1" diameter plastic plugs out of the siding. This is where they drill those attractive holes in the outside wall to blow-in the insulation. Replace them with screened and louvered 1" diameter vent plugs. You can buy these at lumberyards. This will allow the wall cavity to dry out once the wet insulation is removed.

Again, the primary issue for energy efficiency is stopping air infiltration. There is no reasonable payback to blowing insulation into your sidewalls. This practice has truly been the ruination of many of our historic central city homes.

For more information go to **www.nps.gov** and look for Preservation Briefs on insulation. This is the site of the National Park Service.

Filed Under: Insulation | Old House Efficiency | Paint Failure

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One more thing...

Submitted by **tslaw007** on Thu, 05/03/2012 - 1:11pm.

I forgot to mention that I've read several articles that stated that closed cell foam is a solution to older homes without a vapor barrier. Can I get your opinion on that please? Thanks again.

Tom

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buying old house

Submitted by **tslaw007** on Thu, 05/03/2012 - 1:08pm.

Bob,

I'm in the process of buying a 120 year old frame house in Indianapolis. There appears to be an retrofit insulation job that was done at some point (small evenly spaced plugs in wood siding). The interior walls are a mixture of drywall and plaster. My idea was to hire a contractor to remove some of the wood siding to see if there is a moisture problem. Do you have any tips regarding this endeavor? I want to make sure I'm not buying a house that is rotting from the inside out. Thanks in advance.

Tom

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Take a few courses of siding

Submitted by **Bob Yapp** on Tue, 05/15/2012 - 3:36pm.

Take a few courses of siding off at the bottom of the house and see what you find. In most cases it will be wet insulation and mold. You can have this removed if this is the case and treated for mold if you find any. If not, I wouldn't stress about it.

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Your article doesn't solve any problems

Submitted by **homesower** on Tue, 04/10/2012 - 6:01pm.

Bob,

I live in a 1906 foursquare (you can see it at the very bottom of my page http://www.house-design-coffee.com/roof-design.html). It has blown in insulation. Its cold and drafty because the insulation has settled. I agree about your comments on payback but for one thing. An insulated house is not just cheaper its warmer.

You may keep the old houses in better shape with your advice, but they will tend to be empty if people can't be comfortabe in them.

So, do you have a solution? Cause I can tell you non-insulated walls is a no go. We had that on an enclosed porch and that was permanently cold. Yes, caulking and such will help a lot, but its windy where I live, and that old breeze seems to blow right through. That would be even worse with ventilated walls.

I guess what I am trying to say is that you have a first rate knowledge on houses, so can you use that to actually solve our problem?

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Re-"Your article doesn't solve any problems"

Submitted by **Bob Yapp** on Tue, 05/15/2012 - 3:32pm.

You've already solved your own problem---air infiltration is the primary energy efficiency issue in old and historic houses. To compare a closed in porch to the main structure doesn't make a lot of sense. Porches were never intended to be closed in and are generally built on pier footings with air rushing in underneath and windows not designed to stop air infiltration.

Insulation does not stop air infiltration. Never has, never will. Even the claims from the foam insulation industry that their product stops air infiltration are innaccurate at best. Once the foam is in the wall it shrinks. They will tell you it doesn't but they are lying to you. Every wall I've inspected, with foam inside, after 5, 6 and 7 years, reveals that the foam has shrunken away from the studs, plates and sills by as much as 1/2" or more. It also shows the foam pushed so hard on the plaster lath that the lath nails came loose and major plaster damage was caused as a result.

Your house is not "cold & drafty because the insulation has settled", it's cold and drafty because you haven't insulated, caulked, painted or weatherstripped properly. Your cellulose wall insulation has settled because it's wet from the interior moisture trying to escape to the exterior. Remove that wall insulation, mold and the bugs that are probably destroying your house from insuide the walls and insulate your attic. Do all the other things I've mentioned and you'll be toasty, warm in the winter and cool in the summer.

Don't buy into the massive marketing these disposable product hacks lay on you. The difference between them and me is I'm not trying to sell you something. I'm just giving you the benefit of my 37 years in the business and involvement in over 150 toasty and energy efficient properties rehabbed in the upper Midwest.

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warm climates

Submitted by **dinoyn5** on Fri, 03/02/2012 - 1:33am.

The article seems to focus on patterns of heat loss. Do the same rules apply for a hot, humid climate? I have considered wall-blown-in-celluose in south Louisiana to keep the cooling bills down. Your caveat on termites would definitely apply here. I already did the obvious, new efficient windows, attic fan, etc. Just wondering if you would recommend insulating also.

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Blow-In Cellulose Ruining Her House

Submitted by **Bob Yapp** on Tue, 02/28/2012 - 3:24pm.

I recieved this email today which illustrates exactly why I tell consumers who live in old houses with plaster walls to never blow-in cellulose insulation.

"I read your article on blown in insulation. My house was built in 1963 with no insulation in the walls, after the first winter (we could see our breath in the living room) we hired a company to blow in cellulose insulation. We now have a moisture problem, condensation on all windows (which are new) and we have found paint on the outside of the house bubble up with water in it.

We have talked with "experts" in every field but can't come up with a fix for the problem. We would like to vinyl side the house but I am afraid of making the problem worse. In your article you mentioned a paint that creates a vapor barrier, where can I get this and does it really work? Please help any way you can, I am running out of ideas.

Thank you. Julie."

Julie,

You can paint the interior plaster on the exterior walls with an elastomeric paint product (paint that doesn't breath) to stop the interior water vapor from entering the wall and soaking your cellulose insulation. You'll need to caulk the trim to the plaster and add gaskets to the wall switches and outlets to get the most continuous vapor barrier possible.

Remember, if I recommend a product it's beause it works. I take no free product, endorsements or advertising. Having said that, I like a product called Nu-Wal, **www.spec-chem.com** .

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Gambrel roofs

Submitted by **kclougherty** on Wed, 10/12/2011 - 10:11pm.

For slanted gambrel roofs that have attic access and have pre-existing R7 fiberglass insulation with kraft facing paper, is there any reasonable insulation product that can be added? Thank you.

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insulating gambrel roof???

Submitted by **cfl-nh** on Thu, 09/29/2011 - 10:48am.

We have a 2-story gambrel style home and we are going to redo the roof on one of the steep sides. Its only about 300 square feet. The rest of the roof seems fine and was done about 15 years ago. We get terrible ice dams in winter, and the shingles on this part of the roof have deteriorated. We will be putting down the water and ice shield underlayment all the way up. Did I mention that there seems to be no venting in the bottom of the roof system?

But we are still left with problem of poorly insulated walls that lead to the heat loss that melts the snow that then freezes to make massive ice dams. Some of the icicles are as big as my kids...

I don't see how we can easily access inside the walls behind the steep part of the gambrel roof. It then occurred to me that I might remove some of the sheathing once the roof is stripped, and get access to that little chamber between the inside wall and the outside roof. From there I could put in some new insulation. Then I replace the sheathing, and do the roof. I would then have to add some vents on the side of the house to let that chamber breathe.

Does that make any sense? Or should I just worry about insulating the tiny crawl space in the attic? There is obviously massive heat loss from that steep side panel on the gambrel roof.

Thanks!

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insulating slanted ceilings

Submitted by **lavliz** on Tue, 09/27/2011 - 2:44pm.

We recently purchased a 1921 Craftsman house. It has front/rear gables with shed dormers on each side. We have already insulated the floor of the attic space, and have supplies to insulate the sill in the basement. After reading this page yesterday, I'll be calling to cancel the insulation contractor who was planning on blowing insulation into our exterior walls... Our question is this: Is there a way to insulate the slanted ceilings upstairs? (closets) The upstairs 4 corners of the house only have 2 x 4 spaces between the ceiling and the roof. (Would you call that a cathedral or vaulted ceiling?) We were going to have dense pack insulation blown into the spaces. Thanks for any info.

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What about the attic?

Submitted by **maine** on Mon, 01/24/2011 - 4:01pm.

Bob,

Great article-I was wondering what your thoughts are on finishing an attic space.

We have an 1890-ish Queene Anne with several gables and an uninsulated attic (floor has cellulose). We have the beadboard to finish both the underside of the roof and the walls, but are paralyzed with uncertainty over what to do regarding the heat in summer and the cold in the winter (Spring and Fall are just fine!).

I am worried about using something like icynene on the underside of the roof and exterior walls for concerns that the house won't breathe and/or that condensation/mold will be an issue.

Short of creating a finished space with ceiling and walls in the attic that stand off from the exterior walls and ceiling and insulating that (leaving a breathing space between that and the sheathing of the walls and the roof) are you aware of any other solutions?

Thank you!

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blown in insulation

Submitted by **sustainable** on Wed, 11/24/2010 - 11:27pm.

What really got my attention in your article on blown in insulation was your idea that vinyl siding is a vapor barrier on the exterior of a home. Vinyl siding has weep holes atthe bottom of every course, and the afore mentioned aside, it by no means is air tight, which means that it can not possibly be vapor impermeable.

Bob Yapp Says:

Yes, vinyl siding is installed over backer board (insulation board, which the Federal Trade Commission declares does not save energy in any way), and as a result, this double layer effectively creates a vapor barrier on the wrong side of the wall (exterior) and does not allow moisture laden air/vapor to exit beyond the backer board, and even the wall cavity, as it is trying to escape from the interior of the house. This traps moisture causing all the problems I described in the original Blog.

I think that it is important to differntiate between different blown in products. A dense pack cellulose for example greatly reduces air flow through a wall, while a blown in fiberglass does not. It is obvious in your article that you are not refering to a dense pack cellulose as you mention the 1" plugs, which is a hole far to small for a dense pack hose. I agree that lose fill blown in has no place in a wall system and that the best pay back comes from attic air sealing and insulation, but not fiberglass. Fiberglass does very little to inhibit airflow, so you can have R-600 if you like but what does it matter if the air flows right through it? If air flows through water vapor does too.

Bob Yapp Says:

The idea that anyone would use insulation as a primary or even secondary way to stop air infiltration is just absurd. Insulation is to create a thermal barrier.

Dense pack cellulose insulation is not a good product for old houses either. When installed at higher pressures than loose blown-in cellulose, it causes what we refer to as "pillowing". This means that it is packed into the old house wall so tightly, it bowes the wood lath holding the plaster to the wall. This loosens the lath nails and often causes catastrophic plaster failure. This also goes for closed cell & open cell foam insulation products. Since real plaster is a better product than drywall in sound dampening, insulative qualities and historic fabric of old and historic properties, I would say to any old home owner, don't do it. The risks aren't worth the very bad payback (energy saved as compared to the cost of installation).

In fact, as far as I'm concerned, there is no insulation that is installed into an existing wall that has any merit. The cost to do it is too high to save enough energy for a real or meaningful payback. The potential dangers in doing so far outway the psychological boost it may provide. Some might say, well, if we gut the plaster we should be able to insulate the exterior walls. I don't disagree but that is a huge and dirty job that ends up making the insulation job way more expensive and there will never be a payback of any true value.

Attic insulation, foundation sill insulation, good exterior paint/caulk jobs, sound mortar and stopping air infiltration through window and door weather stripping are the best & most cost effective ways to tighten up your old house.

Trapping moisture in your home is indeed a very bad idea. That is why you must take a whole house approach when insulating and air sealing a home, old or new. A blower door must be used to measure air exchange, and mechanical ventilation must be used (prefrable Heat Recovery Ventilation HRV) when the air exchange is lower than 0.35 ACHn (air exchanges/hour under natural conditions).

I also differ with your suggestion of ventilating the wall space after removing the blown in. You earlier say that vapor can by pass the plaster, the insulation, the sheathing and siding (to be trapped by the vinyl), so once you have emptied the cavity, according to that, it should have no problem drying out. If your home was leaky before, wait till you install "screened and louvered 1" diameter vent plugs" in your exterior walls.

Bob Yapp Says:

In regard to your assertion that louvered screened vent plugs shouldn't be installed after wet insulation is removed, I disagree. Usually the cavity is so wet from the moisture trapped inside the wall, if you don't add the vents where the plastic blow-in plugs used to be, mold and bugs will continue to grow. Having said that, it is also important to remove the vents and permanently plug the holes after the wall has dried out.

Also I would really like to know how you came up with the savings to investment ratio mentioned in your article?

Bob Yapp Says: How I came up with the savings to investment ratio in regard to blown in insulation is by:

1) Buying historic houses, estimating the bown-in insulation cost or finding out from previous owners what they paid to have it installed and then examining utility bills on the property before the insulation was installed and after.

2) Talking to homeowners over the last 30 years who have had insulation blown-in to their homes.

thanks,

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I'm from Buffalo so

Submitted by **Ironbeard** on Wed, 05/19/2010 - 2:44am.

I'm from Buffalo so insulating is a priority as earlier stated. When we purchased our home we were forced to gut certain rooms rooms due to mold, water damage, bad piping, bad electric, sagging floors etc. So we insulated regularly with fiberglass after the plaster was stipped. Our house is balloon framed so the insulation fit in perfect. On the 3rd floor, back hallway, and back kitchen we replaced the double hung and replaced with vinyl. They were just too plain jain and too far gone to pay/time investment. We spent the time and money on the windows with character. After 14 vinyl windows and 7 restored and 2 giannnt windows later you could start to see a different. After we reinsulated the 3rd floor it was pretty good.

I was so close to blowing insulation into my walls. I had the machine and the insulation and I called a friend who works on old houses here In Buffalo. The plan was the blow it up in through the basement. He then says to me "wow I didn't know you replaced ALL the knob and tube wiring in your home. Well... no I hadn't just parts. Knob and tube wiring needs space to cool. If you blow insulation around the wiring you have a better chance at starting a fire!

Another thing that was a bonus in our case is there is gas pipes in every room of our home. We installed wall scounces that are duel electric/gas which helps heat rooms. This in conjuction with gas space heat and gas fireplaces we "space" heat all winter. Our heat bill in December with this space heating was $175 which wasn't estimated. Close all your doors and vents to spaces you don't use and buy some warm clothing for lounging around the house. The plastic on the windows doesn't hurt either.

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Mold

Submitted by **ciscogator** on Mon, 01/11/2010 - 10:26pm.

Bob

I've never heard this point of view before and it really got me thinking. I build in TX and in the cities where I work they don't allow and interior vapor barrier. The interior barrior combined with the exterior barrier, which is required by code, is said to create a space that is prime for mold growth. We are only allowed to do an exterior barier between the stud wall and the fascia. My question is if there is a new exterior barrier added is there still a good reason not to insullate the walls. The sidding and paint is protected from interior moisture by the new barrier. Also with proper HVAC and ventalation would there be a build up of interior moisture? I'm always looking to learn something new. Thanks

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Floor boards over earth basement

Submitted by **rufus_78** on Thu, 01/07/2010 - 3:42pm.

I have wood floors nailed directly to the floor joists, which are open to a partial earth basement, and partial cement. I want to insulate the floor and add a moisture barrier.

Should I put insulation inbetween the joists?

Should I put a moisture barrier directly on the joists "sealing" the insulation and floor above?

Should I just put the moisture barrier directly over the dirt?

Thanks!

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dirt floor

Submitted by **sustainable** on Wed, 11/24/2010 - 11:33pm.

You absolutely need to install a sealed vapor barrier over the exposed dirt floor. Anything else will be a nighmare. EPDM sealed at perimeter and seams with closed cell foam.

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Vapor barrier over dirt

Submitted by **Bob Yapp** on Fri, 12/24/2010 - 12:44pm.

I agree with sustainable entirely.

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vapor barrier

Submitted by **jausdok** on Sun, 12/18/2011 - 1:41am.

I agree too that adding a barrier over the dirt.... I did run into one heckuva thing i wanted to share. We put down visquine and 2" foam to crawlspace walls. After about six months the floor joists that had been absorbing moisture all those years began to break down and fail. We wound up putting in new ones thru most of the place as a result. It was a 70's built place and with a pretty high water table, the floor system just got too much moisture to it. It was a foreclosure that had sat empty a couple years. We did a total overhaul as the investors bought it and wanted to give it a new life. Ventilation was all done correctly top to bottom, was just a snag we caught gladly before resale. Thanks for the insulating tips, my reason for landing here, good stuff Bob. I'm in a 150 yr old place here in Illinois, and looking to improve efficiency. I will now not be blowing walls or suggesting it to anyone. Thanks again!!! Mike

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Air-Krete?

Submitted by **Matt Fleming** on Tue, 12/15/2009 - 12:56pm.

What about Air-Krete? Your comments about the vapor barrier totally make sense to me, but I wonder if a closed-cell foam solves this issue? If the water can't get through the foam, it shouldn't ruin the paint job. Also, if it can't get through, isn't it performing the same duties that a sheet of plastic perform? I'm considering doing the cement foam, any thoughts?

-Matt

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is this true for Icynene as well?

Submitted by **stolan** on Mon, 08/17/2009 - 1:41pm.

We've avoided insulating the walls in our 1905 Victorian for the reasons you stated here. However, I've come across a product called Icynene, which says it is an open cell insulation that provides an air and moisture barrier.

Do you have any experience with this type of insulation? It is relatively new and not covered in the Pres. Briefs. We love our house, but the energy costs are considerable in western NY winters - even after insulating all of the areas you suggest.

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Icynene Foam in Old Houses?

Submitted by **Bob Yapp** on Fri, 08/21/2009 - 1:50pm.

Icynene foam insulation is totally unproven and very problematic from my perspective. Anytime This Old House says it's good I'm skeptical. That show is about remuddling and selling product, not good, cost effective preservation.

There is no credible accelerated testing on this blow-in and shave off icynene foam insulation. It expands a lot and so you really have to install it in a gutted wall and shave it off flush to the studs. Not good, very dirty and expensive if you have great old plaster.

Don't forget back in the 1970's the formaldehyde foam industry made the same unproven claims the icynene folks are making today. Ten to 15 years later we opened these walls and found the formaldehyde foam was dust at the bottom of the wall cavity.

Again, the key here ,with a great payback, is to stop air infiltration, insulate your attic and the box sills (the area where the floor joists rest on top of the foundation) in your basement.

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Insulating an old house

Submitted by **kathleen61** on Mon, 08/31/2009 - 11:40am.

On the second floor of our 100+ year-old stucco house in Mishawaka, IN, we have removed the heavily cracked and damaged plaster and lathe down to the brick walls and have reframed the walls. We replaced the "replacement" jalousie windows (sadly installed by a previous owner who must have thrown out the originals) and plan on insulating the heck out of the very high attic. The plan is to install either fiberglass or recycled cotton insulation on the exterior walls with a vapor barrier and drywall over that. Good plan? Preference for either type of insulation?

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