Greenovation : Insulation

PLEASE NOTE:

Everything included in "Greenovation : Insulation" has been transposed directly from the website. That includes references to the PlayHaven Farm LLC and Green Building Project (PHF&GBP) website pages, external websites, links to documents, etc. Because of how quickly things change on the internet, there are NO links from this document.

(April 2009) In addition to getting roofing estimates, we had two insulation companies come out since that was what we were expecting to do this Spring. The previous owner had done a very odd attic insulation installation. There is fiberglass batt above the ceiling then drywall panels installed on top of the ceiling joists and blown-in fiberglass on top of that. The problem with it is that it makes the area between the two layers of drywall a prime environment for mold due to condensation.

The first company is owned by a friend that I know because of all my involvement in the sustainable building movement in Kansas City. He came out and started off by touring the house and making me take notes of what all we needed to be doing in addition to fixing the insulation. What a great guy! He covered the stuff that is in the Energy Audit/Rating and also pointed out things like changing the direction of the louvers in the registers and adjusting the amount of air that goes into the different areas of the house through the ductwork. He was surprised about our attic insulation situation.

The second one is local and was referred to us by our propane supplier. It turns out he is also involved in the sustainable building movement and that was very exciting to find out! He also was surprised about the attic insulation and agrees that it is not a good thing.

Both insulation companies recommended dense-pack cellulose (which we also agree with). We've got one estimate so far and are waiting on the other one... also needing to decide if we can take out the drywall or if there is another way to eliminate the possibility of mold.

So, as soon as we know how much the roof is going to cost us (it has to come first, as much as I'd like to tackle that insulation) we'll find out if the insulation can also be fixed this Spring/Summer or if we'll have to live with it for a while.

Replace Fiberglass in Attic with Cellulose (May 2010)

Here is the important stuff: The R-value of the new insulation is R45... which is about 13 inches of cellulose. They also installed blocking material and air chutes along the perimeter of the attic to contain the insulation and allow for proper ventilation.

Before the new insulation (and after the new roof), in the moderate temps of Spring, it was possible without using air conditioning (AC) to maintain a 15-degree difference between the outside air temperature and the inside air temperature; e.g. at 75°F outside, it would be 60°F.

With the new insulation, we are able to get closer to a 20-degree difference without AC! As an experiment, I set the thermostat to 75°F and watched as the temp in the house rose throughout the day. Reliably, with an outdoor temperature reaching the upper 80's/lower 90's and with the house

starting out at 65°F in the morning, we haven't reached 70°F until about 2:30 pm and the AC hasn't even come on!

Of course, with big, black, long-haired Newfoundland Dogs, 75°F is just too warm, so the thermostat is set to 70°F during the day. But still, that means we're not even using the AC until mid-afternoon. We then let it work in the cooler early morning hours (and cheaper electricity rates) to get down to 65°F.

Here are links to information about cellulose insulation:

- http://bct.eco.umass.edu/publications/by-title/cellulose-insulation-a-smart-choice/
- http://www.cellulose.org/CIMA/

We had planned to fix the attic insulation problem last year before we found out how much the leaking roof would cost us to repair/replace. We interviewed two companies and I had already decided who I wanted to use for this project. So, when we discovered we could fix the insulation this spring, I contacted Eric Butler of Comfort Solutions and he was kind enough to honor his quote from last year.

Working in an attic in hot weather is really pretty dangerous because traditional roofing material absorbs heat from the sun. But our new roof is an Energy Star qualifying 'cool roof' (see the Roof PDF for more info on that) and so we suggested that Eric could schedule us later so he could take care of other customers (who have traditional roofs) during the cooler spring months.

It was late in May when they came out to do our job and it was also the first week that the temps were in the upper 80s to low 90s (°F). Because of our cool roof, the temp in the attic was about the same as outside instead of being much, much higher).

Even still, Eric and Clint worked only in the mornings (smart guys) and it took them only 3 days to get the attic insulation corrected.

Here is a picture of how the former owner did the insulation in the attic.

What you are looking at is the ceiling drywall and hatch access frame... above that you can see fiberglass bat insulation (looks like 6 or 8 inches to me), then a layer of drywall that sits on top of the ceiling joists and then another 4 inches of blown-in fiberglass insulation.

Now, in theory this may sound like a good idea, but it IS NOT A GOOD IDEA because this set up is a perfect breeding ground for mold between the two layers of drywall.

Was there mold, you ask? Yes, but luckily for us, not very much and we didn't have to remove any of the ceiling drywall.

Eric's quote included removal of all the old fiberglass insulation AND all of the second layer of drywall. Of course, that also meant having an access to the attic that they could fit it all through and I really didn't want them taking it through the house (especially with the access being in my closet).

The gable vent on the south side over the master bathroom was a likely candidate especially since we had been thinking it needed to be a bigger vent for the amount of attic space it vented anyway.

So, first things first, Eric removed the 14x22 vent (which turned out to be installed behind the siding... another pain in our side) and cut an opening big enough for the new 24x36 vent. I had to purchase that size vent on-line because none of the home improvment stores carry such big vents.

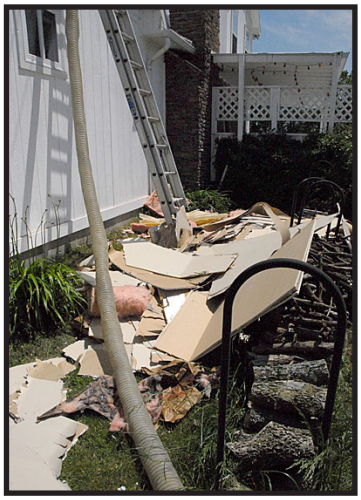
FYI (shameless plug): I am very happy with www.BestMaterials.com! Their prices are good, their customer service is excellent and the product arrived when promised in great condition and is very good quality.

Here is the set-up...

On the left is Eric's trailer with the machinery and hose and cellulose, etc. (it's a really big trailer - you only see the front 1/4 of it in the picture).

In the middle is the 20 cubic yard dumpster from our trash company (close up below in case you want their phone number) with the scrim cover weighted down so that the loose fiberglass stays in the dumpster when it comes out of the hose. They usually use water to wet-down the fiberglass, but we only had 20 psi at the field hydrant and so this was their other option.

On the right you can see the opening with the hose coming out and part of the pile of drywall removed at that point.



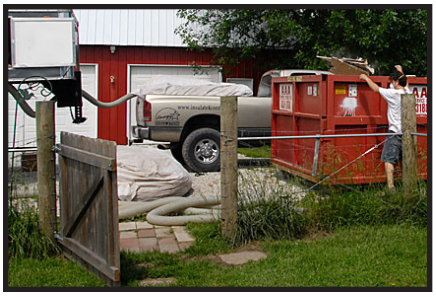
It was next to impossible to get pictures of they guys working in the attic... so Eric is working on getting me some images of what a standard installation looks like to add to this page.

Here is a close up of the pile of material being removed from the 1st floor attic area. Note the fiberglass paper at the bottom of the picture with the mold. Scary to think that could have been a lot worse.

And, no, the drywall was not reusable, nor is there any program in the area to recycle it. If it weren't for all the nails, we had considered putting it on our driveway to supplement the gravel, but alas, that too was not an option. So into the dumpster the drywall went.

Eric had hoped that the bat insulation would be in good enough shape for him to reuse and that was our understanding from the beginning. Which is the reason we only got a 20 cubic yard dumpster.

Unfortunately, it was not in good enough shape to reuse and so we both agreed it should also go in the dumpster.



Having so much bat fiberglass go in to the dumpster meant there wasn't enough room for everything after all... so Eric filled 3 big bags (you can see 2 in the picture at left) with the 2nd floor loose fiberglass. He was able to put one in the dumpster and took the other two back to his shop and his own dumpster.

Eric discovered that the vent to the 2nd floor attic was also installed behind the siding. So, we ordered another vent (24x30, same size that was already there) and he cut out the old one.

Thank goodness the roofers beefed up the structure of the ceiling over the porch when they fixed the roof. It made it much easier to get the fiberglass and drywall, etc. out of that attic.

Here is a rather interesting thing they found in the 2nd story attic. It's a bumble-bee nest in the loose fiberglass. Eric said its all very sticky. And you can just see a bumble-bee near the center of the picture between a patch of pink fiberglass (to the right) and a kind of yellow/ orange tube opening (to the left)... its a very dark spot with a bit of a yellow line on top of the spot.

The roofer had told us the screen on that vent has bad... they had a heck of a time with wasps and bees.

Knowing this, Gary put up a bunch of sticky paper scrolls to help reduce the numbers before the insulation was to be brought out.

Since we had to order another vent, Eric devised a temporary solution to keep out the 'wildlife' and the rain until he can come back out and install the new vent -- once it arrives.

You can't really see it, but there is metal screen material behind the foam board.

Here is the 24x36 gable vent installed and ready to be painted.

I cannot tell you what a relief it is to have have the fiberglass and extra layer of drywall gone from the attic and replaced with blown-in cellulose. I had kept the house very dry all winter to minimize condensation in the attic. Now I can seal up all the paint shrinkage (caused by that dryness) and let the humidifier do its job this winter.

Ah yes, forgot to mention that they found the pink foam board shown at left in the attic... it wasn't sealed in or anything - just laying in the ceiling area over what used to be the porch and is now the entry hall. The insulating properties are not effective if its not sealed.

We are going to be using it in the loft area of the garage... one of our do-it-yourself over time projects.

And, Eric, being the great guy he is, used a couple pieces to insulate the hatch cover in the master bedroom closet (sealed and everything).

Add Closed-cell Foam to Crawlspace Below Master Bedroom/Bath and Basement Rim Joist (September 2011)

The Energy Audit we had done before we bought PlayHaven East included a recommendation to insulate the crawlspace under the Master Bedroom/Bath, the rim joist in the basement, and the floor of the north hall (the old porch that is now enclosed). We had hoped to do that when we had the attic insulation fixed, but money is (unfortunately) a contributing factor when doing renovations and we simply couldn't afford it then.

When we found out the HVAC repairs would be so expensive that it only made sense to replace the entire system now (rather than repair now and replace in a year or two); it also only made sense to get the insulation all up to par to reduce our electric bills (the new system is geothermal which uses electricity).

We chose a closed-cell foam installation because it both seals and insulates and is ideal for moist (or I should say, possibly moist) areas. I found several sites on the internet recommending fiberglass insulation for crawlspaces. If you choose to use fiberglass, be sure you are not creating a habitat for mold. Fiberglass may insulate, but it does not seal and if there is a paper backing, it is food for organisms (like mold).

Here are some links to information about crawlspaces.

- http://www.dirt-crawl-spaces.com/crawlspace-insulation.html
- http://www.buildingscience.com/index_html

I've said it before and I'll say it again... we have been SO happy with Eric Butler at Comfort Solutions, that I simply want to work with them whenever possible. So, it's probably not a surprise that we chose Eric to do this job.

This is all BioBased 1701s® Spray Polyurethane Insulation (1.7 lb. closed cell). Eric wore a mask, gloves, etc. because the two components separately are bad to breath and get on your skin. When they mix together (at the sprayer) and cure, they are inert. This product is GREENGUARD Certified for Children and Schools, Class 1 Fire Rated.

The photos were taken after the foam had cured. Thanks to the hubby for being willing to go back down into that crawlspace for me.

The wall at left is the basement wall (east),so it did not need to be sprayed.

South wall (at left) and west wall.

West wall.

Close up of west wall where the concrete floor of the garage ended and the foundation was extended to the north.

Northwest corner where the stairs from the driveway went up to the porch.

Below are the basement rim joist photos.

We moved stuff away from the walls and covered shelves, etc. before they sprayed.

The photo above left shows the closed cell foam along the rim joist and the one above middle shows it is also between the floor joists.

Here is a close-up... I love the color!

I forgot to mention that in the basement, the guys also removed and disposed of the old fiberglass bat that 'insulated' the rim joist.

(There wasn't any to take out of the crawlspace.)

And, like the conscientious people they are, they cleaned up the small amount of mess that was left.

In addition to insulating, the foam also stops air infiltration (like using expansion foam in cracks). One less place for air and bugs to find their way into the basement!

Add Cellulose Under the Floor in the Front (North) Hall (September 2011)

After the guys (of Comfort Solutions) did the closed cell foam applications, they came back a couple days later and put cellulose (high borax content) in the gap between the current floor and the old concrete porch floor of the north hallway. We are sure that this area is where we had mice coming in last year and that is why we decided to go with the high borax cellulose... even if they start to burrow in, they won't live long enough to make it through. Sad for them, but necessary for us.

This required a bit of prep work on our part. There is a laminate wood floor in that area and the hubby removed the baseboard and enough of the flooring so that Eric could drill a hole in the subflooring into each cavity (between floor joists which run north and south, the width of the area). I put painters plastic over the doorway to the living room (taped all the way around ,removed the furniture, wall hangings, curtains, etc. and stuffed towels at the bottom of each french door with tape in the gap where they meet to keep the cellulose dust out of the rest of the house.

Drilling the holes.

Notice how he stuffed a towel into the next couple of holes in case there were any openings between the cavities.

Another one of my ‘artsy’ images, just thought it was too much fun not to include it.

This is what the cellulose looks like.

Each cavity is densely packed.

It was interesting to see watch Eric determine how it was filling up... there was a difference in sound, the material slowed in the tube until he pulled it out enough to allow more room to fill up. I was fascinated.

After the cellulose was all done, the hubby replaced the flooring (even repaired a section where the previous owner had left a register that wasn’t connected anywhere) and the baseboard. It is one of those hidden projects, you can’t tell by looking it was ever disturbed. Hopefully, we’ll be able to tell by the money we save!