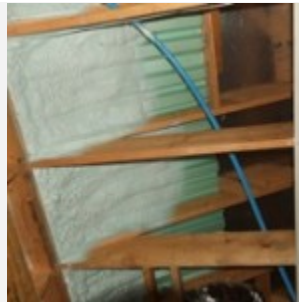


SHEETROCK AND INSULATION START



Some pretty fancy curves that the drywall guys are bending 5/8" sheetrock around. I didn't think it bent like that!

There are five types of insulation going into the house: sprayfoam polyurethane, straw bales (of course!), bluejeans cotton batts, radiant barrier (bubble wrap and roof board), and cellulose. Each has its job, and its strengths and weaknesses.



Spray foam

Spray foam: You can spray it almost anywhere, it sticks to any surface, it fills and expands in every crevice, and it creates a beautiful air-tight seal. That, coupled with its high R value ("7" per inch) make it an excellent insulation – what's not to love?

Insulation is mostly about "R value" or a measure of thermal resistance, which for the *real* geeks reading the blog has US units of $\text{ft}^2 \cdot \text{deg F} \cdot \text{h} / \text{BTU}$

Unfortunately, it has a fairly high percentage of fossil fuel content, and high embodied energy (see the blog entry "and then it was juuuust right"), it is expensive, and it gives off toxic fumes if your house should ever burn down – so we'd rather not use it anywhere a thicker layer of a lower performance insulation will do. But where our insulation will be thin (like in the strawbale library ceiling), or prone to air leaks (like around the edges of our roof vent baffles at right), sprayfoam is the right insulation for the job!



Strawbales in the library

Strawbales: A properly constructed strawbale wall is conservatively estimated at R 30 (with all the gaps filled with straw)... but given that it is 24 inches thick, that only comes to R 1.3 per inch – not exactly high performance insulation. Still, it is a very well insulated wall simply because the walls are so thick. When you take into consideration that it has zero (or even negative!) embodied energy since it is an agricultural waste product that it would otherwise take energy to destroy, it is about the greenest thing in the whole house.



Blue jeans between the floors

Bluejeans: In between the upstairs and downstairs floors, we're using old recycled bluejeans cotton batts. They have an R value of 3.7 per inch, are easy to attach into a ceiling, and have nice sound attenuating properties (we'll have wooden floors upstairs, so you don't want it to sound like elephants pounding around above your head). Relatively low embodied energy, and recycled material!



Radiant barrier

Radiant Barrier: This is an insulating material that is more difficult to assess the value of. Radiant barrier is being installed in the roof where it is an integral part of the roof board (it comes with a radiant barrier film on the back side), and in the East, South and West facing walls it is being used in the form of radiant barrier "bubble wrap" that will sit behind the cellulose wall insulation (see pic at right). Some radiant barrier is marketed with "R numbers" ranging from 4-6, but that doesn't really apply – it isn't much of a conductive block, it rejects heat gain from radiation in infra red wavelengths. It is pretty much useless unless it faces an airgap of some sort, hence the film on the roof board that has the attic space as its air gap, and the bubblewrap in the walls which maintain an airgap with the integral air bubbles. How good will it be in improving the heat rejection of the house during the summer and the heat retention in the winter? We haven't attempted the calculation, and we're not quite sure where to start. Honestly, this is one of those "gut feel" decisions that could be useless, or could be the most important aspect of the insulation on our walls.... we need a guest post from a real heat transfer specialist.



Blown Cellulose Insulation: In the insulated attic spaces outside of the library and in the exterior walls, we will be using wet-pack blown in cellulose insulation which is mostly recycled newspaper plus flame retardant. It has an R of

3.7 also, but because it is blown in, it fits around pipes, switch boxes, wiring and odd-shaped areas better than cutting and fitting bluejean batts. So while it isn't as good as stopping air leaks around your insulation as sprayfoam is, it is much better than the batt forms of insulation in complicated areas with lots of perforations (in a Princeton study there was a 24.5% reduction in air infiltration for blown in vs. fiberglass batt). It is largely recycled content, and ends up with less than 1/4 the embodied energy of fiberglass and 1/25th the EE of spray foam! No picture yet – the cellulose installed this week is all up on the other side of the drywalled ceiling. Next week there will be pictures from the walls.

Source : <http://www.301monroe.com/?p=192>