

From the
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To insulate or not to insulate

Making the Best Choice for Historic Buildings in a Tropical and Wet Climate

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With extreme freezing weather in the northern states and excessively humid weather in the southern regions, everyone knows that insulation is a must. Right? Especially with high energy bills making the entire nation

cool air and is very good at finding ways to do this. The resulting problem is that when warm, wet air hits a cool surface (the back side of your wall) the humidity in the air can be released as condensation, which is



Spray insulation gone wild. This structure has had the tight seal of the siding compromised and now will have to worry about water infiltration.

cry Uncle. Don't be fooled. The solution is not to have cheaper energy; the solution is to need less energy to cool and heat your house. Can this be done? You bet. Insulation that gets stuffed into the walls is not the only (or best) energy strategy for a tropical region. See below for some easy guidelines that can make a big difference.

Now here is the technical part that everyone needs to know to make an informed decision on what is needed for a historic house. Outside air needs to stay outside to lower a structure's energy usage. Unfortunately, outside air wants to be at the same temperature and humidity level as that within the structure. This very simplistic statement means that the energy in warm air is always trying to mix with

how moisture gets trapped inside your house. If there is not a strategy that allows this condensation to dry out, the house will start on the path to decay. The difficulty is that this air movement gets pushed by the earth's weather systems through the walls of a building, around those windows that are not weather tight, under exterior doors with worn out thresholds and literally, through any opening in the building. Minimizing this invisible attack is the most important step toward insulating a house.

These first strategies are, conveniently, the most cost effective. Weatherize all openings that pierce a building's envelope. This means weather stripping all windows, repairing doorways, sealing attic stair open-



A radiant barrier installed by volunteers. Notice the snug fit between panels to prevent heat from passing through the barrier. This has a good air space between the material and the roof deck.

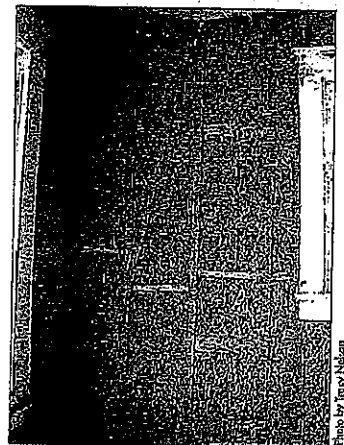
ings, cooling attic spaces, insulating around the openings for plumbing and electrical services and, in many old houses, filling in the gaps in the original wood floor. All these are fairly simple and inexpensive solutions and can be good do-it-yourself projects.* These strategies do not include the "tear out and replace" philosophy. That approach is a very expensive reaction with a low return on the dollar. Additionally, the equity in a house is reduced when original material is lost and replaced with modern products – bad strategy. The other serious, human-comfort antagonist is the sunshine that heats up a house. If solar gain is controlled, you may discover that wall insulation is not even needed. (Refer to our Web site listed below for suggestions on these money-saving strategies.)

The second strategy to explore is the more traditional one of wrapping a house in insulating material. And while this seems great in the winter, if not handled correctly it can be like a sweater worn during August – it can cause a house to sweat. So before a trip is made to the local home-improvement store, consider these following points:

- Every house is different and each one has many energy strategies unique to its location, landscape and construction method.
- Treat insulation behind plaster differently than insulation behind Sheetrock.
- Insulating under a house is very risky business.
- High quality products must be used – poor materials give poor protection.

- Hire a professional installer and inspect the finished work – a poor installation job can cost up to 30 percent or more in energy saving and is one of the most common causes of mold growth inside a house.
- Every available space does not have to be insulated.
- Remember that well-fitting curtains (against the cold) and closed shutters (against the heat) are great insulators.
- For the highest savings, seal as many air leaks as possible. Understanding that cold air moves downward and hot air rises can help to track down air infiltration.

Lastly, a house that is too airtight has its own set of potential health issues. Luckily, historic houses were built to breathe, which is a healthy bonus that comes with the purchase. However, if a building is over-insulat-



Cellulose sprayed into the wall cavity. This soft and benign material is easily removed.

ed this valuable attribute can be lost. What is needed is balance. Learning to interact with a building is the easiest strategy and is usually free. (For no-cost habits that can immediately save you money, see #4 in the references below.) It is important to remember that the restrictions addressed below in this article concerning wall insulation are for hot, humid climates. Icy temperatures have different criteria for insulation strategies.

So, where to start? The first step is to keep the air- and heat-conditioned spaces protected from the unconditioned spaces. If a house has been weatherized as recommended above, and the energy bill is still high, then the air that is coming through your building envelope is what needs to be addressed. (Don't confuse a large bill with using a lot of energy, look at the actual kilowatts used.) Areas of concern include the roof, attic space, flooring and walls. These spaces are where the insulation everyone is familiar with comes into the picture.

The first and easiest installation method is attic insulation, either between the roof rafters or the ceiling joists. In the vented attic of older buildings insulation goes between the ceiling joists. This protection keeps the warm outside air from going through the ceiling. Make sure that the insulation does not incorporate any vapor barrier or paper facing. The insulation should be prevented from getting dirty as this reduces its effectiveness. If the attic is not vented, the easiest solution is to use a radiant barrier over the attic rafters. This will prevent 95 percent of the heat from your roof (that pesky sunshine again) from coming into the attic. Make sure that the radiant barrier has an air space between the material and the underside of your roof. These two solutions can be used together.

Wall insulation is the most difficult insulation strategy to get right in a humid climate as it can lead to problems like mold, saturated framing, and termites coming to dinner. Remember, in an older house, wall insulation may not be the best choice. There are other options available and when the original plaster is still intact, there is a new set of rules.

Plaster is like a pair of lungs for a house. The nature of the lime in plaster causes this wall material to absorb, hold and breathe out moisture that touches it. This creates a cooling effect inside the building and prevents condensation from occurring. The beauty of plaster is that mold does not grow on it, and even if plaster gets saturated (by sitting in water) it

only has to be cleaned, not removed. Wet Sheetrock walls would have to be replaced. Insulation should not be used behind plaster. An empty wall cavity allows incoming heat to rise as well as gives electricians the ability to repair or upgrade old wiring while the plaster is in place. There are a few controlled options available but these would require an installation method of removing the siding and insulating from the exterior of the building, which is very expensive. Removing plaster and replacing with insulation and Sheetrock is a waste of money both through the new dollars spent and the loss of equity in the home by the removal of this very expensive and valuable material.

However, if the plaster is gone and the walls are open, a good tip for insulating the wall cavity is to create an air space between the insulation and the exterior wall so that when moisture collects, it has the ability to dry out. When using Sheetrock the goal is to keep the moisture away from it, either from direct water infiltration (a bad gutter that puts water inside the wall or a leaky window) or through humid air. Use only paperless Sheetrock to avoid mold. The natural inclination is to put a moisture barrier between the wet air and the insulation to protect against condensation forming behind the Sheetrock. But even the experts cannot decide on the best way to use a barrier within historic houses built in a tropical climate as every strategy has a "that might work, but..." attached to it. It is a difficult situation without a simple answer. The one scenario that never has this problem is the wall that has no insulation.

Insulating under the house is the last strategy and not a good idea in humid areas. Even if it is done correctly it is very expensive and can hide potential problems as it covers the framing of the house. Installed poorly it is ineffective, loses its insulating value as soon as it gets dirty or damp and is a good home for outdoor creatures. And the installer sandwiched under your house may not take the time to do the job correctly. There are other options to address this concern that are listed on our Web site.

In the end, don't be shortsighted by letting your energy saving desires compromise the long-term value and integrity of your historic house. There are always strategies that can give you both.

* A study by the US Department of Energy shows that the savings from simple weatherization have a 2.2 times return above the actual cost of the improvement.

CONVENTIONAL BUILDING INSULATION PRODUCTS

Cellulose Insulation – can be used as loose fill (in attic) or blown in (in wall cavities) – benign, renewable and natural material with high insulation value; blocks air infiltration like spray foam; can be easily removed in the future; does not interfere with the services inside the walls – good product for older houses – can be problematic if it gets wet.

Rigid Insulation – good strategy if applied properly; very labor intensive, which makes it expensive; needs a professional who understands the issues related to condensation and this material.

Batt Insulation – most common and easy to install. Made of fiberglass (that itchy feeling), it will lose all insulating value if it gets wet even once. The batt with the paper face easily grows mold if it gets damp; if compressed down or there are gaps around the edges, the insulating value is significantly reduced.

Spray Foam – has a good insulation value at the same time that it blocks air infiltration; the concern is that this product is made of petroleum chemicals, will encase all the wires and plumbing inside the walls if installed poorly (this is a bad thing), is impossible to take out if needed (like after a flood); improper installation can result in this product oozing in places it should not be and even underneath the weatherboards.

Insulation in a Bag – never recommended in humid climate; holds moisture in the wall cavity.

WEATHER BARRIER PRODUCTS

Radiant Barrier – a thin material that looks like flexible tinfoil. It is used to bounce back energy waves of heat created by the sun and is a simple but effective reflector.

Air Barrier – a thin material that is commonly known as house wrap. It is commonly used under siding but in a humid climate it must be permeable to moisture or water can be trapped inside the wall cavity.

Vapor Barrier – a material that stops the movement of water vapor. It is almost impossible to get the application right in a humid climate and should only be considered on the exterior under the siding if considered at all.

REFERENCES:

1. Carayon, Edward, A Manual for the Environmental & Climatic Responsive Restoration & Renovation of Older Houses in Louisiana, Louisiana Department of Natural Resources.
2. Tiller, Jeffrey S. and Dennis B. Creech, Builder's Guide to Energy Efficient Homes in Louisiana. Louisiana Department of Natural Resources, 1999.
3. Louisiana Department of Natural Resources, "Quick Notes on Achieving Energy Efficiency, A Five Part Series," available from www.dnr.louisiana.gov.
4. Home Energy Saver Energy Advisor; available from <http://hes.lbl.gov/hes/makingithappen/tips.html>. accessed Jan. 15, 2009
5. Historic Building Recovery Grant Program Web site; for additional references go to www.ct.state.la.us/HP/HBRGP/.



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