The Greener Side
Building a Sustainable Community
Volume 1, Issue 5, December 2002/January 2003
the bi-monthly newsletter of the Western North Carolina Green Building Council

Any questions or comments about the newsletter should be sent to robin@rowhouse-architects.com

Thank you to Carolina Animal Action for the donation of a table and canopy for outdoor displays.

WNCGBC
PO Box 8427
Asheville, NC 28814
www.wncgbc.org

First Annual International Green Building Conference & Expo a Success

By Duncan McPherson

Austin, TX skyline

The U.S. Green Building Council sponsored the First Annual International Green Building Conference & Expo in Austin, Texas on November 12th – 17th. The conference featured renowned speakers such as Dr. David Suzuki, author, scientist, and television series producer, and Christine Todd Whitman, Administrator for the U.S. Environmental Protection Agency among others. Over 80 educational sessions were presented by leading experts on subject matter including: the LEED program (Leadership in Energy and Environmental Design), energy efficiency, building science, water conservation, and policy and planning, to only name a few. A Green Building Forum for Young Professionals was also offered, where nearly 200 students and emerging building professionals attended to discuss ways to network and support the next generation of green building professionals. Additional programs offered at the convention included an Exhibit Hall, Gala Awards Dinner, LEED training workshops, and a Green Building Tour, which visited 3 residential and 3 commercial projects in Austin. The Exhibit Hall included over 200 vendors of green building-related products and services. The event was the largest of its kind with over 3,500 people attending. Additional sponsors for the event were the Austin Energy Green Building Program, AIA Committee on the Environment, Construction Specifications Institute, Urban Land Institute, and the U.S. Department of Energy. The highly anticipated 2003 Conference and Expo will be held in Pittsburgh, Pennsylvania from November 12th – 14th at the David L. Lawrence Convention Center, the first "green" convention center in the United States.
For more information visit the US Green Building Council's website at: www.usgbc.org

How Can I Join?

Simply fill out the form below and mail in with your membership dues.

(dues are for one year membership)

Name _____

Title _____

Affiliation_____

Address _____

_____

City _____

State _____ Zip _____

Phone _____

e-mail _____

Date _____

Membership catetories:

- Individual $35
- Business $100
- Nonprofit $50
- Silver Level Sponsor $250
- Gold Level Sponsor $500
- Platinum Level Sponsor $1000

Total Amount Enclosed _____

The Mission Statement:

The Western North Carolina Green Building Council is a non-profit organization whose mission is to promote environmentally sustainable and health concious building practices through community education.

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Crawlspace Evolution

by Issac Savage

With the increasing awareness of moisture problems being a big cause of poor indoor air quality, energy efficiency, and building durability, people are beginning to rethink the way we build. With mold litigation cases continuously on the rise, many builders and landlords are left feeling a bit uneasy. How should this problem be addressed? Fortunately, there are folks out there studying these problems, scientifically, documenting their findings, and looking at the way we build through a physicist's eye, concentrating on the effects that moisture, heat, and air flow have on our buildings and our health.

As many know, the crawl space can be a potential nightmare when it comes to moisture problems. Typically, a vapor retarder is installed over the earthen floor (typically only covering 80%), vents are placed in our foundation walls to help "dry" the crawl space in the summer months while the vents are open, while closing them in the winter to keep the cold air out. As a recent study by Advanced Energy has documented, this may not be the best method. It may in fact be the worst method.

Where is the moisture coming from that ends up accumulating in the crawl space? If the building is constructed with proper water management details, then there are only two sources for this moisture: the earth and/or the hot and humid air that flows through the vents in the summer time. There is a lot of moisture stored in the soil. When left untreated, this moisture is quickly absorbed by the wooden members that are only a few inches away. There is also a lot of moisture in the outside air that we often invite into our crawl spaces through these vents which some codes require. This sets up an ideal situation for condensation. Moisture in the air (vapor) will always flow from high to low. This means that the moisture is constantly trying to get into your crawl space. Once it gets there, it is often much cooler than the outside air, allowing a multitude of surfaces on which to condense. Once condensation occurs, the moisture often tends to puddle on the vapor retarder, which will eventually be absorbed by your house.

When your crawl space relative humidity reaches 70% and/or your wood moisture content reaches 20%, you've got problems. Mold spores thrive at 70% RH and wood begins to rot at 20% MC. This is almost impossible to prevent when you have holes in your walls that allow this warm, moist air to enter. So, lets get rid of the holes. Okay, so now we have no holes in our foundation walls, but we still have this sheet of 6mil poly on the ground that only covers about 80% of the floor, has seams that aren't taped, and stops about a foot shy of the foundation walls. This will still continue to allow moisture to escape from the ground and into your building, eventually leading to durability issues, health concerns, and energy issues.

One solution may involve sealing the crawlspace and insulating the foundation walls as to prevent moisture infiltration and allow the removal of the insulation between the main living space and the crawl space, thus allowing the floor joists to dry completely, eliminating the moisture that leads to mold growth. The crawl space (essentially, a mini-basement) is kept dry by bringing the crawlspace within the building envelope and providing a supply of dry air from the main living space.

Unfortunately, the time of year when most crawl spaces are in the worst condition (summer) is also the time when the air conditioner runs the most. This can be a very scary combination if you have leaky ductwork in the crawl space. If you have a return leak, you are sucking this nasty, moisture laden, and perhaps mold infested air right into your ductwork which distributes it all over your home, not to mention putting a heavy load on your HVAC system due to the high moisture content. If you have a supply leak, then you are depressurizing

Elections

The following members are now board members (terms noted)

Terry Albrecht (2003-2004)
Marcus Barcsdale (2003-2004)
David Brannon (2001-2003)
Claudia Cady (2003-2004)
Robin Elliott (2003-2004)
Boone Guyton (2001-2003)
Aaron Johnstone (2001-2003)
Traci Kearns (2001-2003)
MaryBeth Kingston(2003-2004)
Duncan McPherson(2003-2004)
Cindy Meehan-Patton(2003-2004)
Isaac Savage (2001-2003)
John Senechal (2003-2004)
Bobby McHugh (2001-2003)
Matt Siegle (2003-2004)

Officers were chosen as follows:

Boone Guyton
President
Duncan McPherson
Vice President
David Brannon
Secretary
Cindy Meehan-Patton
Treasurer
Aaron Johnstone
Member at Large
Marcus Barcsdale
Member at Large

WNCGBC CALENDAR

Dec. 2, 2002 WNCGBC Monthly Board Meeting
5:15 – 7:00 – Land of Sky. E-mail robin@rowhouse-architects.com for info.
Dec. 7, 2002 WNCGBC Annual Strategic Planning Meeting
1:00 - 5:00 – Bobbi Tousey's home. E-mail robin@rowhouse-architects.com for info.
Jan. 8, 2003 WNCGBC Monthly Board Meeting
5:15 – 7:00 – Land of Sky. E-mail robin@rowhouse-architects.com for info.
Feb. 11, 2003 WNCGBC Monthly Board Meeting
5:15 – 7:00 – Land of Sky. E-mail robin@rowhouse-architects.com for info.
Feb. 12 - 15, 2003 GreenPrints 2003- Sustainable Communities by Design
Atlanta, Ga. Greenprints Programs http://www.southface.org/
Feb. 18, 2003 WNCGBC Public Forum - topic MSRI (Million Solar Roofs Initiative)
5:00 – 8:00 – Lord Auditorium. E-mail robin@rowhouse-architects.com for info.
March 30 - April 1, 2003 - National Green Building Confrence
Marriott Waterfront Baltimore Maryland NAHB Research Center | Conferences and Seminars | National Green Building Conference http://www.nahbrc.org/

If you have an event to add to the WNCGBC Calendar, please contact robin@rowhouse-architects.com

UPCOMING EVENTS

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your home. This could potentially cause backdrafting of combustion appliances or cause air from the crawl space to be sucked into your living space to replace the air that was lost. Therefore, it is recommended that you have your system checked and sealed to ensure proper pressure balances are achieved.

The crawlspace is perhaps the most widely used and most misunderstood form of foundation system used in the housing industry. This system evolved slowly as people felt the need to raise the floor above the ground to provide a place for ductwork, piping, and electrical wires. Since first ppearing in written material in 1946, moisture problems in crawl spaces has been a topic worth studying and has led to codes that deal with this specifically. With the mold issue quickly climbing to the top of the public's (and lawyers') interest in housing, it is highly recommended by many building science professionals throughout the country that more attention be paid to the physics of our buildings. We must be able to control the moisture in order to ensure a safe, durable, energy efficient building for our families or our clients.

Isaac Savage, of Home Energy Partners, invites your questions/comments and can be contacted at 828-628-9910.

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As for Dave Beattie, he is looking into future sources of funding to increase the access of Americans to green roofs. Currently, a company called JSP International has been funding the research, and Beattie is planning to go to the Department of Energy, the Department of Environmental Protection, and the Department of the Interior, "because there are so many reasons why we should have green roofs. It's energy, it's water, it's aesthetics." He's been having a difficult time so far. He explains that Americans look for short-term solutions that are also cheap: "Commercial buildings today have a lifespan of twenty years. In Germany they put up a building and it may have an infinite lifespan."

But green roofs *are* being installed in the United States and Canada today. The green-roof industry, although small, is growing. And "Yes," Beattie says, "there is a payback. There is a return on investment."

If you're not sure you're ready to green the roof of your house just yet, consider starting with a smaller project. Play around with the possibilities and get the kids involved. Remember that any roof can be greened, from your garage or garden shed to your children's playhouse or even a birdhouse or mailbox!

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A Garden on Your Roof

by SUSAN CAZENAVETTE HERRICK

Although they still exist in Ireland and Iceland, sod houses can hardly be considered practical for the average American today. However, there is always the green roof. Modern versions of the traditional sod roof have been under development in Germany for more than three decades, and in that country alone, more than ten million square feet of green roofs are installed annually. The market is growing at a rate of more than ten percent every year.

The green roof is a cousin to the rooftop gardens traditionally found on top of skyscrapers and parking garages. However, these traditional rooftop gardens are too heavy for smaller buildings, such as most single-family homes, and require a great deal of upkeep. Researchers, therefore, divide green roofs into two categories: the heavy *intensive green roof*, and the lightweight *extensive green roof*.

Intensive rooftop gardens allow city dwellers to create private sanctuaries within the city and even to produce their own food. Their potential to reduce the urban heat island effect has also been recognized. In fact, the Environmental Protection Agency instituted an Urban Heat Island Mitigation Initiative in 1997, encouraging the greening of rooftops in cities throughout the country. The City of Chicago has estimated that its new City Hall rooftop garden will save $4,000 a year in heating and air conditioning bills, as well as helping to combat air pollution.

But it is extensive green roofs that will be of interest to the American homeowner. These roofs are already quite popular in Europe. The Swiss government provides financial incentives for the installation of green roofs. "Other countries tend to do it more because they're good stewards of the environment, the Scandinavians in particular," says Dave Beattie, a graying, soft-spoken man, who doesn't seem the type to fight windmills. And green-roof legislation has been passed in Germany and Japan. New industrial buildings in parts of Germany are required to have green roofs. And in Tokyo, since last spring, new buildings of a certain size must green at least twenty percent of their roof space.

Benefits

The three principal benefits of green roofs are insulation, storm-water retention, and aesthetics. The insulating factor may be most important in North America. Green roofs can help keep buildings warm in winter and cool in summer, allowing the homeowner to conserve energy and to save money on heating and air-conditioning. The vegetation has a moderating effect on the temperature inside the house. Beattie explains, "The plants are transpiring, and that's an energy-using process. They absorb energy from the atmosphere in order to translate that water from a liquid to a gas, and that's why plants are good air conditioners. They're basically swamp coolers."

On a similar note, green roofs help to reduce smog and ozone pollution, improving the quality of our air by producing oxygen and absorbing carbon dioxide in the atmosphere. Dark-colored surfaces, including asphalt and most rooftops, absorb light and heat, and when a large number of these dark surfaces are crammed together, as in a city, the effect can be quite noticeable. The Urban Heat Island effect often means temperatures up to ten degrees Fahrenheit higher than those of surrounding rural areas. In Tokyo, for example, the average yearly temperature increased by 5.2 percent over the course of the twentieth century. When heat and light react with air pollution, the result is smog. Vegetation can help to lower air temperatures considerably, and no space is more abundant in a city than rooftop space.

The climate in Germany is mostly oceanic, meaning that they don't get the extremes that we see in many parts of the U.S. For them, the value of green roofs is not so much related to heat and cooling but rather to storm-water runoff. Green roofs have the potential to hold water on the roof, therefore reducing water pollution and flooding. "In Germany, they'vemanipulated the Rhine River," Beattie says, "so that it has no place to spill over its banks anymore—it's all paved on its edges. They have a lot of trouble with storm-water runoff, because once it hits the river it has no place to go. So today, almost no building goes up without a green roof, and it has really, really softened the impact of storm water. As soon as the water hits it, it sort of soaks it up, holds it there, and then releases it much more slowly than it would if it were just running off the top of a flat roof." This green-roof feature could be as beneficial in many flood-prone areas of the U.S as it is in Germany. In Louisiana, for instance, the degradation of wetlands has caused serious danger to life and property from excess stormwater. After Hurricane Frances passed through in September 1998, major highways near New Orleans re-

on a personal note. . .

Two and a half years ago I called Cindy Meehan Patton because I had heard that she was interested in green building. She had already been trying to get more interest in green building going in the area and was glad to arrange a meeting that included John Senechal, Patrick Dukes and me. That was the beginning. It was appropriate that Cindy became the first president of the council and it was impressive the amount time and work she has committed to the cause since. Cindy also brought a lot of connections and the energy to follow up with them, most obviously, in the case of the Mayor's roundtable. We are fortunate to have had her as president and are glad she will continue as Treasurer.

Thanks Cindy!

Boone

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After Hurricane Frances passed through in September 1998, major highways near New Orleans remained flooded for up to two weeks and some evacuation routes were under water, sending local residents into a panic. It could have been worse.

Of course, green roofs also look better than most other roofs. In the city, hotel-room views could be vastly improved, and in rural areas, green roofs could help buildings to blend in with their natural surroundings. Architects could have a field day with this idea. And because of this aesthetic factor, green roofs, as long as they are well designed and maintained, have the potential to substantially increase property values.

Extensive green roofs require little maintenance, making use of drought-tolerant, hardy sedums, mosses, wildflowers, and grasses that can withstand climactic extremes. They lengthen the life of your roof by protecting it from the extremes of temperature that cause it to wear and crack, as well as from UV radiation and other climactic stresses. According to Dave Beattie, "With the black surface, the temperature of a roof can be upwards of 180 degrees, and that's pretty darn hot. Then it goes down at night, depending on where you are, to maybe 60 to 70, so those are extremes. The membrane expands and contracts, expands and contracts, and after a while the material, not being perfectly elastic, tends to fatigue, and breaks up. But when you use roof greening, those temperature extremes are moderated, and so the life of the roof might be extended two or three times."

The waterproofing ability of your roof, as with a normal roof, will be the most important consideration in its construction. The company who installs your green roof will offer a guarantee for the waterproofing integrity of the membrane. Also make sure that the company uses materials that are environmentally friendly and won't leach pesticides or other toxins.

Greenroofs consist of several layers: a waterproof membrane, a filter fabric, a growing medium, and some type of vegetation. In addition, when the plants are first transplanted onto the roof, some form of jute matting will be needed to hold them in place until they are able to develop adequate root systems. Steeply sloping roofs may also be fitted with steps or terraces and some sort of grid to hold the soil in place and to minimize erosion. Also, a layer of gravel may be installed around the outer edge of the roof to provide extra drainage, as well as roof access for maintenance. If properly constructed, a green roof will not cause water damage to your roof but will in fact protect it from leakage.

One final benefit of green roofs is that a whole new industry will have to be developed, a little bit at a time, in order to provide the roofing membranes, growing media, plants, labor, and instruction books necessary for the installation of more and more green roofs. In the process, new jobs in horticulture, design, architecture, engineering, construction, research, consulting, and other fields will be created.

Challenges

A green roof adds to an existing roof a root-repelling membrane, a draining system, a growing medium, and living vegetation. In theory, any roof can become a green roof, even one that is steeply sloped. There are problems to be dealt with, of course: "Well, if you water the roof, where is the water going to go?" asks Beattie, "It goes in and down. Gravity is going to pull it down. So what you in effect create is a swamp at the bottom and a desert at the top." But not to worry. Researchers are playing with ways of keeping the water spread more evenly over the roof. These involve steps or terraces, or a roofing material with holes in it "like little flower pots all over the roof."

However, it is important that you understand the carrying capacity of your existing roof before installing a green roof. Unlike German roofs, most American roofs are not strong enough to hold a load of soil. "We use lighter construction techniques in this country," Beattie tells me. "They [the Germans] have retrofitted a lot of their buildings with this technology, and because they already had the structural integrity of these buildings, it supported the weight. We have to be extremely careful because we need wet loads of probably under 12-14 lbs per square foot, whereas Germans routinely install these green roofs with weights of 20-25 lbs per square foot." Beattie and others are currently looking into lightweight growing media to replace soil on American rooftops. These media will also be much more resistant than regular soil to erosion. The deeper the growing medium, the more stability, insulation, and moisture retention the system will have—but this will also put more strain on the underlying roof structure. A licensed engineer or architect will be able to advise you on the structural integrity of your existing roof and the corresponding safe load. You will also need to obtain permits from the Zoning and Building Departments before you can start construction on your new roof.

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P U B L I C

F O R U M

U P D A T E S

The most recent public forum was on the topic of indoor air quality. If you would be interested in finding out more information, contact the WNCGBC for more direction or contact the Green Building Hotline!!

232-5080 or email

info@wncgbc.org

Our next public forum will deal with the MSRI (The Million Solar Roofs Initiative). The forum will be held on February 18, 2002 at Lord Auditorium in the Public Library. A snack reception will be held from 5:00 - 5:30. The presentations will run from 5:30 to approximately 7:00!!! We hope to see you !!