

## Do green building methods work for people with environmental sensitivities?



**Building methods that are “green,” “ecological” or “sustainable” are sometimes not usable for environmentally safe housing. We discuss some pitfalls when using green building methods.**

*Keywords: green building, green construction, ecological, sustainable, building, healthy house, environmental sensitive, chemical sensitive, MCS, earthship, recycled material, earth tube, natural material, indoor air quality, green building certification, green builder*

People with environmental sensitivities need an indoor air quality far beyond what is common in normal housing. Regular materials, such as carpeting and manufactured wood products, are generally not acceptable because of the fumes they generate.

## 2 *Green building or healthy building*

When building a new home or renovating an existing one, it seems the obvious choice to use a green builder. After all, the green builders focus on natural materials instead of the toxic stuff used in regular construction. Unfortunately, it's not so simple. Some people with chemical sensitivities (MCS) have found it frustrating to try to work with green builders. Many of their practices are not suitable for the most sensitive people, but may work well for the moderately sensitive.

### **Focus on green**

There is no definition of what makes a building “green,” but green builders typically focus on:

- Energy efficient heating/cooling
- Less energy-consuming materials
- Recycled/reused materials
- Natural materials
- Low VOC materials

### **Natural and less energy-consuming building materials**

The green builders focus on using natural materials that use less energy to manufacture, such as wood, adobe and straw bales. These materials are problematic to many highly sensitive people.

Wood emits natural volatile organic compounds (VOCs) called terpenes. Terpenes are what gives the smell of a pine forest. Some types of wood emit fewer terpenes than pine, but they are more costly.

Even low-terpene types of wood, such as maple, still offgas terpenes and can be problematic.

Natural materials can also create mold problems in a house after several years' use, or if there are water leaks or condensation. To counter that, green builders often add preservatives that create their own problems.

In contrast, houses built for people with environmental sensitivities (such as MCS) often use materials such as:

- glass
- aluminum
- steel
- concrete (additive-free)

- fired bricks
- ceramic tile

These materials all take a lot of energy to manufacture and thus are not considered “green” or “sustainable.”

## **Recycled materials**

Green builders favor recycled materials instead of using more of the Earth’s resources to produce new materials. These include:

- Reused building products
- Recycled paper and cardboard
- Recycled concrete
- Other recycled materials
- Waste products from industry

The problem here is that these materials are often contaminated or moldy. Materials that will be recycled are generally considered waste products of very low monetary value, so there is little incentive to take good care of them. Pallets of old paper or cardboard can sit out in the rain for days without anyone getting concerned. Meanwhile, mold will fester and the spores are not killed when the material is reprocessed.

A problem with recycling is that all sorts of trash can find its way into a recycling bin or dumpster, especially if not monitored. This includes household trash, leftover fast food, old appliances and more. (This problem may be worse in some cultures.)

Gypsum wallboards (drywall) are often made from recycled materials. The gypsum may be recycled from a demolished house or it can be a waste product from the scrubbers on coal-fired power plants. There are plenty of contamination possibilities in either case. If it comes from a demolished building, the gypsum may have absorbed pesticides, fragrances and other toxics while installed in the previous building. When the building is demolished, the workers may not protect the gypsum from rain. The pile may sit for days in a dumpster while being rained upon. Drywall is a perfect breeding ground for mold.



*Insulation material with recycled content, but what contaminants are there?*

If the gypsum comes from a power plant, it is likely to contain impurities from the coal that was burned, including heavy metals.

The paper backing is usually recycled material.

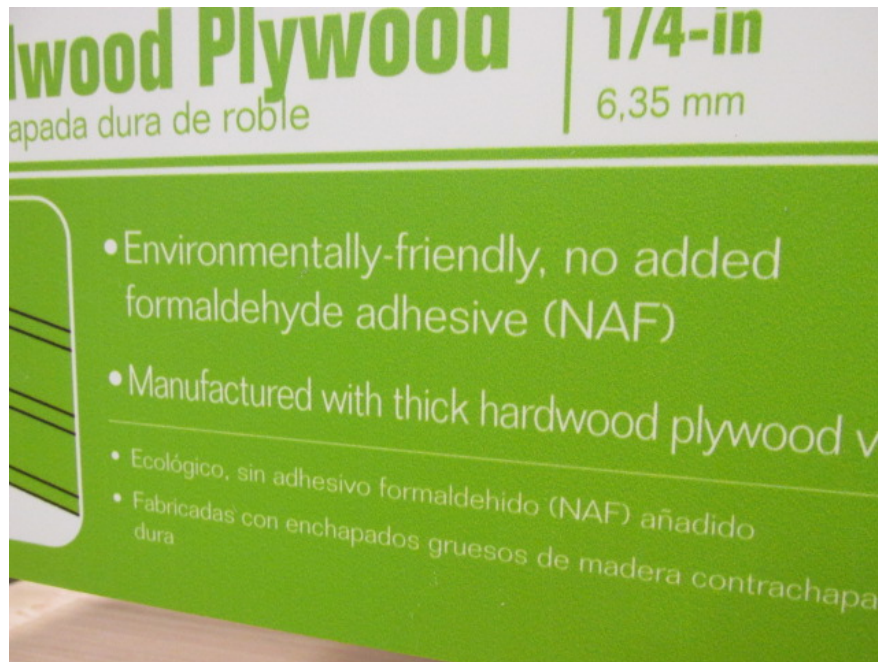
In 2016, Birgitte Andersen and other scientists at the Technical University of Denmark tested thirteen sheets of gypsum drywall they got directly from a multitude of stores. Every sheet contained mold spores just waiting for moisture to flourish. The manufacturing of the sheets did not sterilize the spores.

Fly ash and slagger from coal-fired power plants and other industries are commonly added to concrete, but it can give the concrete a permanent odor that is bothersome to sensitive people.

Ground-up concrete from demolished parking lots and roadways are considered “green” materials to add to new concrete. But what about all the oil spills?

### **Greenwashing**

Greenwashing is when a manufacturer promotes a product as green, but it really isn't. They may make one change that is for the better, but that doesn't make the product green.



*Plywood advertised as a green product with no formaldehyde “added.” This is not the same as formaldehyde free, as formaldehyde may still be generated by chemical reactions in the glue. And even without formaldehyde, there are probably still other toxic chemicals in the glue.*

## Windows

Windows are manufactured with frames of vinyl plastic, wood or aluminum. The vinyl has long-term offgassing problems, the wood has terpenes and must be painted now and then. Aluminum frames are commonly used in healthy houses, but they do not have the insulation value of wood or vinyl, so green builders don't like them.

## Green paints

Choosing a paint is often the most difficult and most treacherous part of building or renovating a home. There are many types of earth-friendly paints available, but many of them are not friendly to sensitive people.

Paints made of natural materials, such as milk paints and clay paints, are healthier for the painter, but they tend to contain preservatives and often never become fully odorless. We have seen several people use these paints and never be able to tolerate them.

The safest type of paint from the perspective of highly sensitive people is baked-on powder-coated paint. This is typically used on steel appliances. It is extremely



toxic and energy intensive while curing in an oven, but afterwards it is the most inert paint there is.

Some sensitive people prefer high-VOC paints — once they have cured for some months. The low-VOC/zero-VOC latex paints often don't work so well — even long term.

### **Natural walls**

Walls made of stuccoed straw bales, logs, adobe, cob, wheat boards and other all-natural and non-toxic materials seem like the perfect fit and for some sensitive people they work well. But others are not able to live in such houses. The natural terpenes never offgas, not even after a decade. And then there are the mold problems that may show up after some years.

### **Natural floors**

Natural floors is a relative term. Much of what is sold as “natural” really isn't. Bamboo floors and many wooden floors are actually glued laminates. Even genuine solid hardwood floors can still be a problem due to the terpenes and the occasional need for surface treatment.

More radical all-natural flooring, such as tamped earth floors that are sealed with linseed oil are problematic, mostly because the linseed oil never becomes odorless.



*Bamboo is considered natural, but contains a lot of glue and is not suitable for the very sensitive.*

## **Composting toilets**

Green builders like composting toilets since they save a lot of water and the composting is inherently greener than rural septic systems or urban treatment plants. However, for sensitive people there may be problems with:

- odors
- mold
- noise (some models)
- EMF (some models)

Since composting toilets do not flush, they need to be cleaned daily to avoid smells. The composter stores months' worth of feces inside, where microbes (i.e. mold) digest them, which may be a mold risk.

Some models use electrical fans or heating elements, which can cause noise and EMF problems for some people.

Composting toilets are used by people with environmental sensitivities, but much thought needs to be put into choosing the right model, and the daily cleaning need must be considered.

## **Solar systems**

Rooftop solar electric systems are universally considered to be green. However, the inverter that turns the DC electricity from the solar panels into something that can be sent out on the grid creates high levels of dirty electricity throughout the building. This can be a problem to some sensitive people.

There are healthy inverter-less DC-only solar systems, but they have limitations most people would find unacceptable.

## **Electronic energy saving devices**

There are many energy saving devices available that are popular among the "green" building community, but all are problematic for sensitive people because they create dirty electricity or wireless radiation. These include:

- smart meters
- low energy light bulbs (CFL, LED)
- variable-speed motors
- wireless smart thermostats and sensors

- automatic light dimmers

The variable-speed motors are used in some energy-efficient air conditioners and forced-air heating systems. The motors are basically controlled by an inverter.

The automatic light dimmers are used in some office buildings that also use natural lighting.

### **Earth tubes**

A “green” idea that keeps popping up is to cool the house by pulling air in through long tubes buried in the yard. The soil is cool in the summer and air passing through the tubes will cool before entering the house. The fan uses a lot less electricity than an air conditioner.

The problem is that when air is cooled down, it becomes less able to contain moisture. The result is that water will condense on the inside of the tubes. Then we have a cool, moist and dark space that is a great breeding ground for mold — right in the airstream into the house. People have tried to “solve” the problem by coating the tubes with fungicides, but is that really such a great idea? Don’t do this! Not even in the dry desert.

### **Earthships**

Architect Mike Reynolds came up with an ingenious way to solve the problem of what to do with all the used automobile tires. His earthships have hundreds of tires embedded in their walls and covered with stucco. The ceilings are made of wooden logs, rainwater is collected and filtered. Indoor plants are encouraged. These earthships are beautiful houses in the style of the American Southwest.

But to sensitive people, there are several problems. The many toxic tires in the walls are not sealed airtight, and they will emit low levels of fumes forever.

The houses are typically built into the side of a hill for energy efficiency, and have flat roofs. Along with the indoor garden, these are features that can eventually cause mold problems, even in a desert.

The wooden ceilings are also a problem for many sensitive people.

### **Green building certifications**

Professor Anne Steinemann reports in a 2017 article (“Ten questions concerning green buildings and indoor air quality”) that there are 55 different green



certification schemes in more than 30 countries. What such a certification means for the indoor air quality varies.

Green certification schemes award points for many features that are unrelated to indoor air quality, and even some that are detrimental. Points may be given for using recycled materials, energy efficiencies and locating the building in polluted high-traffic areas (to save energy for commuting). Building products and maintenance materials that meet the requirements can contain problematic pollutants, such as fragrances, terpenes and essential oils.

Some schemes allow a building to obtain the highest green ranking without any measures to improve the indoor air quality at all. Other schemes do require basic minimum indoor air quality measures to qualify. However, the air quality issues still tend to drown in the list of features that are considered worthy of points.

It appears that green certifications are well intentioned, but insufficient to ensure a usable air quality for highly sensitive people.

### **Hiring a green builder**

Any green builder who does not have direct experience in building specifically for people with severe environmental sensitivities will have a lot to learn. Whether he or she is willing to accept this is a personal matter. Some will be willing to take on the challenge, others not. Some will be insulted that their methods are not healthy for some people just as conventional builders can feel insulted. Green builders can be just as resistant as anybody else.

It is imperative to be sure that any builder is willing to learn what they need, and they fully understand the needs of the people they are building for. Be careful with people who are full of self-confidence and brush off these concerns as unimportant or “already taken care of.”

### **More information**

More articles about designing, building and renovating homes and buildings for people with environmental sensitivities are available on [www.eiwellspring.org/saferhousing.html](http://www.eiwellspring.org/saferhousing.html).