

## **So You Want To Build A House?**

*By Peter Ruggles*

You've decided you want to build a safe house. How do you begin? Just as most (MCSers) are usually aware, everybody's sensitivity is different, so most will define a safe house in different ways. It's going to be your house, though, so this time 'safe' is what is defined by you.

There are a number of issues to look at. Where are you going to build? How much can you afford to pay? How big do you need your house to be? What are your most acute sensitivities?

A big part of building a safe house is finding a safe location. Although living in the city is convenient, many of us have built well outside town in order to find an area where we aren't bombarded by our neighbors' addiction to Monsanto. Suppose your great aunt has taken pity on you while on her deathbed and offers to build you the absolute safest house money can buy, but with one stipulation – its got to be built on her vacant lot in the new subdivision overlooking the 8<sup>th</sup> fairway. I mean, what's the point? Have her build the latest stucco box, rent it out, wait for her to die, and use the proceeds to build what you really need.

We spend a lot of time commuting to Tucson in order to live out where we do, which means our car expenses are quite a bit higher than they would be if we lived closer. However, for the clean air and quiet, for us it is well worth it. In fact, if we had the choice of living in town without reactions, I don't think we'd take it. You will need to consider the trade-offs and figure out where you will be comfortable living.

Budget is probably the major issue for most EIs. Unfortunately, houses are expensive. Safe houses are more expensive. However, many people have found creative ways to build safely, cheaper. We know a man who built a very small place and lined the walls with glass (over the drywall) to give himself a safe environment. Several people in the same area used foil backed drywall, with the foil facing the living area. These homes won't win any House Beautiful decorating awards, but they are safe. If you want a house that looks more conventional, it will cost more, but there are alternative materials that can be substituted for the toxic ones.

Two excellent resources for healthy home building are [Prescriptions for a Healthy House](#) by Paula Baker et. al., and [The Healthy Home](#) by John Bower. If you plan to build, get these books. Read them. Read them again.

Decide what you are comfortable with. Talk to anyone you know who has built a safe house. There are a number of us in the HEAL group who have recently had a home built, and each of us learned a lot going through this.

Part of the process of deciding how to build your house will be testing materials to see if you can tolerate them. Start testing well before you have to finalize your design. You do not want to rush this step, and end up using a material you can't tolerate, or stop construction to try to find a safe material. Only after you have a good idea of what materials you can use are you ready to put it all together and decide how you are going to build the house.

I found very few resources on ideas for the total package. In fact, the only one I remember is a house design promoted by John Bower, which I don't agree with. His method uses a lot of questionable materials, which are then sealed in the walls to protect the occupant. Here is where your creativity combined with talking to anybody you can who knows anything about building can help. I was unsure how to build the exterior walls on our house until I talked with an MCS ignorant co-worker who described a type of house that was being built in Rita Ranch, the mega-subdivision a few miles from where I work. That method – block walls with an inner steel frame wall – is what I ended up using in our house.

Building a house is a lot more involved than can be described in a short article such as this. Hopefully, though, this will give you some ideas or motivation to get started. Although it may seem daunting, it can be done, and it can be done successfully.

## **Part 2**

You've decided you want to build a safe house. A safe house begins with a safe design. There are a lot of factors that go into designing a safe house, but many of them can be broken down into more manageable choices. For example, your choice of kitchen cabinets and countertop does not affect the type of roof or insulation you choose. The structure of the house is the main part that interacts with other aspects. Designing a safe house is a series of trade offs between what you can afford, what your sensitivities are and how big you want your house.

We considered our MCS needs for all of the aspects of our house. To give you an idea of some of the things we considered in our house design, I'll talk about the house we built, some of the tradeoffs we considered, and why we made the choices we did. Parts of this column may be boring, but just remember – an engineer wrote it and I did the best I could.

The first decision we made was to not put anything in the house that Pam couldn't tolerate. As a result, we have zero engineered wood (OSB, plywood, pressboard) in our house, among other banned materials. I feel good just typing that! There were two reasons for this. First, we were living literally 30 feet from the corner of the house, so using untolerated materials meant probable reactions until they were covered up. Second, I don't fully trust enclosing slightly toxic materials in the house structure and counting on the seal to completely and forever keep them out of the living space.

The second decision we made was how to build the structure of the house. One of my big concerns was to design a house that wouldn't be a feeding ground for termites. Seeing tented houses in town is a reminder of the risk of flying termites that make their home here in the Southwest. This led us to specify a cinder block outer wall and steel framing. I didn't want to use just a block exterior wall due to the poor insulating value, so we have steel framing for all the walls, including inside of the block walls. This decision also led to steel trusses and a steel (standing seam) roof. We avoided engineered wood on the roof by having it installed over purlins – a metal track connecting the trusses in a ladder like fashion.

To avoid engineered wood and pine, we ordered metal cabinets for our kitchen and bathroom. The countertops are stainless steel and tile. Our doors are solid hardwood. Both of these items were ordered from companies out of state. We used redwood headers between our walls and roof trusses instead of the conventional choice of pressure treated wood.

Due to a dust sensitivity, we designed our house without ductwork. This is not a common design feature, as we discovered when we started talking to the various heating & air conditioning contractors. We were able to do this by using radiant floor heating and a combination of split system and wall unit air conditioners. Radiant floor heat works by pouring the concrete slab for the house (no additives) over a series of tubes which are used to circulate hot water (warm water, ~100 degrees, actually) which heats the floor. The fact that Pack Rat Peter had saved solar collectors scavenged from his previous job 15 years prior helped with the decision to use this type of heat. Split system air conditioners use a heat pump like conventional systems, but instead of having the heat exchanger in a furnace which then distributes the cool air using ductwork, the split system heat exchanger has a built in fan, and is mounted on the wall in the room being cooled. We used wall unit air conditioners in the three bedrooms that were too small to justify the larger split system units. Another decision based on the dust sensitivity was to install a central vacuum system. Pam loves it!

Warning! Dry paragraph ahead.

We had our electric wiring put in conduit to reduce electromagnetic fields. Although Pam doesn't have major EMF sensitivity, we were aware that these sensitivities can develop, and didn't want to invest this much into a house only to not be able to use it in the future if this did happen. Our walls are adobe plaster, because our tests indicated that she wouldn't tolerate drywall. This may have been one of our most expensive decisions, but it was one we felt we had to make. We specified thermal break windows to eliminate condensation, which could lead to mold formation. Our insulation is a foamed-in-place magnesium oxide which we used in our walls and ceiling. This was chosen to avoid the formaldehyde in fiberglass insulation. I've heard that formaldehyde free fiberglass insulation is now available, but I haven't heard from anyone how well it is tolerated by EIs.

So there you have it. All the knowledge from my brain transposed onto the written page.

### **Part 3**

You've decided you want to build a safe house. How are you going to build it? You have found a piece of property that doesn't have high tension lines, a cotton farm next door or the Interstate for your backyard. You have completed the design of your safe dream house. Now what?

First, are you going to build it (act as the contractor) yourself, or hire a builder? If you have to ask "What should I do?" the answer is: Hire a builder. Obviously, you will need to find a builder who is willing to build your house the way you need it built, as opposed to their normal way of doing business. But first, you need to develop a list of specifications.

Your specifications need to be thorough and spell out everything that you need done on your house, as well as things to avoid. Do you want the foundation poured using additive free concrete? Write it down. If you don't want any engineered wood used in the house, write it down. The more details, the better. For example, if you are using drywall, you can specify the brand, where to buy it, how to put in on the walls (for example, drywall screws only, no adhesives), how the walls are going to be finished, including the type or brand of drywall compound, and any other specific needs you have. The more detail you put in your specifications, the better protected you are.

We had an experience during the construction of our house that was solved because of our specifications. We specified aluminum framed, thermal

break windows to avoid the treated wood used in typical wood windows. A thermal break window uses a two piece insulated frame that minimizes transfer of the outdoor cold (or heat) through the high conductivity frame to the indoor side of the window. Soon after we moved into our house, we had condensation on the inside of our windows during a snowstorm. It turned out that our builder confused “thermal break” with “double pane” windows and installed the wrong type. Since the thermal break windows were listed in our specifications, the builder had to replace the windows at his expense.

Once you have a rough draft of your specifications, you are ready to search for a builder. This can be a challenging task for someone with MCS. I’d start by asking people you know for references. You could also look in the Yellow Pages, although it may be harder to find out if a builder is reliable. After you have some candidate builders, call them on the phone. At this stage, you don’t want to meet face to face, to avoid an unnecessary exposure. Talk to them about your specific needs and see how they react.

There are few builders that have experience with chemically safe houses, so this may be your builder’s first such project. If a builder is comfortable with your specifications they are much more likely to comply with your needs than someone who looks at you like you are crazy.

Ask about their terms. Some builders will quote a house for a specific price. Others will build for a set percentage above the cost to build it. There are advantages and disadvantages to both. With a fixed fee contract, any changes you make during construction can be an opportunity for the builder to add on extra fees. With a cost plus percentage contract, you could end up paying more than you budgeted, especially if you run into problems during construction that are expensive to fix. In either case, you should put a clause in the contract to spell out who will pay for subcontractor mistakes, such as the cost to remove and repair a kitchen wall because the sub-contractor forgot and used a bunch of adhesives to glue the cabinets to the wall.

When you budget for your house, keep some money in reserve. the cost to build a house often changes, and ends up being more. You might realize part way through that you really want to add a closet in your laundry room, or the nice carpenter you talked with might not be able to deliver on those low priced cabinets you agreed to, which you may then need to replace with higher cost cabinets.

Before you hire a builder, get some references. Although this might be the builder’s first chemically safe house, and therefore references couldn’t

comment on that aspect of the project, you could find out how reliable or flexible they are.

Before you tackle such an important job, educate yourself as much as possible about the construction process. This will help you understand what is happening, to specify alternatives that are safe for you, and to ensure that the house is built to meet your unique needs.

#### **Part 4**

You've decided you want to build a safe house. What special features do you want? There are a lot of options, from the obvious – no pesticides in the foundation – to the more esoteric such as a full house, remote operated electric shut off 50 feet from the house for an EMF sensitive occupant. In this article, I will randomly talk about some options to consider when building a safe house.

Pam just loves our central vacuum system. We've never known a canister type vacuum that didn't emit yucky dust into our house, even when we had one of them really neato Rainbow vacuums. Thing of the past now. Whooooo!!! Even if you don't get the full system due to budget constraints, you can have the tubing installed when you build your house, to save money on a retrofit installation after the walls, insulation, etc. are in place.

Even if you aren't electromagnetic field (EMF) sensitive, you may want to include a low EMF construction design to minimize or prevent development of future sensitivity, and to make your home more tolerant for your EMF sensitive friends. There is a lot that can be done to manage and reduce EMFs, such as shielding, house layout, isolation, purpose designed switches, filtering, grounding, lighting, etc. I'll just touch on a few of those here.

When designing your house, you can create a floor plan that concentrates high EMF devices, such as appliances, hot water heater, electric panel, etc. away from working and sleeping areas. Maybe you want to be the first on your block (or range, depending on where you build) with a separate wing for your laundry room, kitchen and utility room. While you are at it, you could build a wing off the wing for your EMF mother-in-law or EMF father-in-law, in case they visit.

Did you know those DC transformers used for your phone answering machine, doorbell, rechargeable flashlight, etc. put off high EMFs? If you can't live without them, you could install a transformer in a remote area of the house (like the wing), to eliminate the transformers in your living space. GFCI outlets, required by code in some areas such as the bathroom and

kitchen are also higher in EMFs than standard outlets. If you control these outlets with a wall switch, you can turn them off when not in use. When wiring your house, using twisted pair wires in conduit (an electrician will understand) will reduce EMF fields as compared to conventional wiring.

Enough on EMF. Back to layout. Particularly if you live with others who might go somewhere and get exposed to something you could react to, you can include a detox room, isolated from your living space and with a separate entrance, where that person can come home and clean up before coming in the house. A separate foyer where you can remove your shoes and jacket before coming in the house.

We did not use any engineered woods in our house. This resulted in our choice of metal cabinets in the kitchen and bathroom. This may not be affordable for you. One solution is to buy metal countertops (like they use in restaurants) and use metal shelving underneath.

I've seen several houses that place the TV in a separate room or cabinet with a glass window to isolate it. You could too!

In short, there are countless options available to make your house more tolerable. Your choices will reflect your sensitivities and budget. These ideas are just a start. The more time you spend talking with MCS friends and thinking about your needs, the better able you will be to design your house to be the safest place possible for your needs.

*Peter enjoys battling the gophers, ants, birds, coyotes, deer and javelina in his valiant attempt to create a productive garden.*

A version of this article was previously issued in Ecologic News, the newsletter for the HEAL support group in Tucson, Arizona.