



WORKING WITH THE ELEMENTS

# Under One (Good) Roof

*Second in a series* by Glen Salas for the PATH Partners

Whether ordinary or ornate, the roof is your first line of defense against the outside elements.

photos courtesy of CertainTeed

You're about to make what is probably the biggest purchase of your lifetime—and then leave it outside, perpetually exposed to and weathered by the elements. A little time spent thinking about the roof of your new home is time well spent.

This is the second in a series on working with the elements to protect your home investment. In the first part, we described how your house, your lot, and the components of each act as an integrated system. We showed how to use this system to make your property attractive, durable and functional in ways that enhance your local environment. The results: a holistically satisfying yard that naturally requires less upkeep and less water. Now we'll look more closely at the roof, which shelters and protects your family from the elements, and consider how it can actually be built to work with those elements—to your advantage.

**PROTECT AND PRESERVE** Did you know that a well-designed roof lets sunlight in during cold months, but shades the windows during warm months? And can you believe that a roof on which plants grow can actually last longer and provide better protection than a standard roof? (See “The Grass is Always Greener.”)

When your home and its various components work together, in harmony with surrounding natural forces, the benefits multiply. Your home will be more comfortable and more environmentally sustainable; it will last longer with less maintenance; and your water and energy bills will be lower.

Because the roof is your first line of defense against the outside elements, it's also the best place to work with those elements. Even if you already own a house, but just need a new roof, most of the following discussion applies to you. But if you think you need to extend your eaves or if you want to turn your roof into a living roof, contact a professional engineer to make sure your structure can handle it.

**THE BASICS** To ensure that your home is comfortable and adequately protected, select a roofing system that is best for your area. Go for comfort and durability without sacrificing appearance. Your roof affects comfort? Sure, because a roofing system that heats up too much or doesn't provide the proper shading can overheat a home and heat the home unevenly.

**Asphalt shingles** are the least expensive and most popular, but not the longest lasting. In most areas, standard asphalt shingles last 15 to 20 years. **Premium asphalt shingles**, rated for 25 or 30 years, are available at higher prices. If you live in a hurricane or tornado area, you should strongly consider the new high wind shingles, which are rated for winds up to 135 mph.

**Metal roofs**, very popular in the Southwest and increasingly popular in the West and Midwest, are almost twice as expensive as standard asphalt shingles, but last 10 to 20 years longer in any climate and are virtually maintenance free. **Wooden shingles**, often chosen for their appearance, cost well over twice the price of asphalt shingles, but usually don't last beyond 20 years. **Clay tile roofs** are very expensive and last more than 40 years in mild climates, but often weather quickly in less moderate climates because freeze/dry cycles are not kind to ceramics.

Always make sure that window overhangs are correctly sized to allow sunlight into the house during the heating season and to shade the windows during the cooling season. Your heating and cooling bills will be lower and your home will be more comfortable.



Overhangs also let you throw open windows and let in the soothing sound of falling rain – without letting in the rain itself.

Don't forget to properly insulate your roof to save energy and improve comfort. Use ENERGY STAR® insulation levels (see “Building Technology 101” in *Her Home* magazine, Spring 2004). Additional considerations: in hot regions, you can save a lot on air conditioning bills and actually make your home more comfortable with light colored roofing, which reflects rather than absorbs the sun's heat. Radiant barriers – thin, reflective material installed on the underside of the roof – will generally save you another 10 percent off your AC bills in hot areas.

**ASK THE BUILDER:**

- ✓ Will the overhangs allow direct sunlight into the house in the winter but not in the summer?
- ✓ Which roofing material do you recommend? Why?

- ✓ Will you use ENERGY STAR® insulation levels in my roof and ceiling?
- ✓ (In hot climates, only:) Can you install radiant barriers in my roof?

**ADVANCED ROOFING PRACTICES** How can the roof work for you? By allowing in comfortable levels of natural light, generating electricity and hot water, and capturing rain-water – and by lasting a long, long time.

**DAYLIGHTING** Thanks to recent improvements in window design, it's easy to let more natural light in your home. It's a practice called “daylighting.” You see it at work in the new generation of skylights (which don't leak like the old ones did) and in clerestories, vertical windows located high on interior walls. Clerestories “daylight” a home with less direct sunlight and less heat than skylights. Choose ENERGY STAR skylights and clerestory windows for substantial energy savings.



CLOCKWISE FROM ABOVE: Correctly sized overhangs allow sunlight into the house during the heating season and shade the windows during the cooling season.

An orderly row of dormers increases the level of natural light inside this home.

Asphalt shingles, available in both standard and premium grades, are the most popular shingles used.

Today's new generation of skylights don't leak like the old ones did (when properly installed, of course).



**Tubular skylights** are similar to conventional skylights, but they can focus the daylight on a particular area within a room, or even daylight a lower floor or the basement. Tubular skylights have a roof-mounted light collector that directs sunlight through a metal or plastic tube with a highly reflective interior coating, and then through a fixture into a room. Though more expensive than skylights, tubular skylights protect carpets and furniture from direct sunlight's damaging ultraviolet light, and add almost no solar heat gain. Some tubular skylights incorporate electrical lights so the fixture can provide light both day and night.

**ASK THE BUILDER:**

- ✓ Does our roofing warranty protect us from leakage around skylights, too?
- ✓ Where can we strategically add skylights? Clerestories?
- ✓ Are my skylights and clerestories ENERGY STAR® qualified?

**SOLAR POWER** The future is now for generating your own electricity. While still relatively expensive, solar panels, or photovoltaics

(PVs) as they are called, will usually pay for themselves in 15 to 25 years by generating electricity. Sure, \$25,000 (the approximate cost of a 2-kilowatt system, before federal and local tax credits and other incentives) is a big extra, and 20 years is a long payback period. But look at it this way: How many other parts of your home actually pay for themselves—ever? And it's fun to go out to your electric meter on a sunny day and watch it spin backwards as your electric utility company pays you for power. If your system is installed with battery storage, local power outages won't affect you.

The best (least expensive) time to install a PV system is when a house is being built, because the solar panels can be easily incorporated into the roofing system. Some people don't like the way solar panels look on a roof, but they can be attractively incorporated into the overall design of any new home. Some manufacturers also offer shingle solar systems that look and install just like ordinary shingles. Obviously, PVs make more sense in sunnier areas. Some builders in the Southwest actually offer PVs as standard equipment on all of their houses.

Solar hot water, a separate system from PVs, uses another type of roof-mounted solar panel to heat your domestic hot water directly. Solar hot water systems on new houses are very cost effective in sunny climates, and even make financial sense in many cooler areas. A solar hot water system can also supplement your furnace if you have a radiant floor heating system.

**ASK THE BUILDER:**

- ✓ Have you installed solar power on any of your previous homes?
- ✓ How much will a PV system cost? How about a solar hot water system?
- ✓ What kinds of incentives are available for PVs and solar hot water?
- ✓ How can solar panels enhance our roofline?

**WATER FROM ABOVE** Rainwater collection makes sense, too. Why let all of that rainfall run off your lot when water is becoming so precious? Collect the water in containers that are fed directly from your downspouts, and then water your landscaping with “free” water. Mosquitoes won’t be a problem if you cover the tanks, put screens over open tanks, or bury the storage tanks. You won’t need any filtering or treatment if you just use the collected rainwater to water plants or wash cars.

**ASK THE BUILDER:**

- ✓ Can you divert our downspouts into some sort of non-corrosive storage tanks?
- ✓ Is there somewhere we can install those storage tanks so we can water some outdoor plants without having to use a pump?

The key is to combine technology with common sense. Our ancestors had some pretty good ideas about working with the elements, but they unfortunately didn’t have today’s technology to help them along. Today, we have the technology. Now let’s connect the technology to an intimacy with nature and provide a better shelter for our families. ■



Photo courtesy of ZinCo International



ABOVE: Living roofs cool, insulate and protect the home; benefit the environment; and look beautiful.



Photo courtesy of Linda S. Velazquez, Greenroofs.com

RIGHT: It’s a roof. Believe it or not, John Alexander and family can grow tomatoes, basil and oregano on their living roof in Seattle, Washington.

# THE GRASS IS ALWAYS GREENER... ON THE ROOF?

Not really, but the “living roof” is a fascinating roofing system: an exotic-looking, lightweight, long-lasting roof covering that replaces conventional roofs with an impervious covering, a soil mixture and a garden of growing plants.

According to Fred Oesch of Oesch Environmental Design, “The living roof, in theory, never needs to be replaced. Once established, it needs little or no maintenance.” It’s long lasting because the plants and soil mixture actually protect the underlying roof membrane from the natural elements—heat, freezing and thawing, ultraviolet light, hail, and acid

rain—better than conventional roofing. “A living roof may even perform best if just left alone,” says Oesch. “By allowing it to grow, mature, die, and fertilize itself, the cycle of regeneration is perpetuated.”

Reducing storm runoff is one of the most important features of living roofs, which act as sponges. Living roofs also provide insulation, and the plants provide their own respirative cooling to the roof.

Typically, the roof plants are short perennials and succulents, which don’t require much water or care, but grasses, sword ferns and even woodland strawberries are sometimes used. Oesch says that

several nurseries throughout the country specialize in these plants, which are climate specific.

“Rainfall is captured by the soil mixture and vegetation,” says Oesch. “A roof with three inches of soil will hold about a half-inch storm event before any water runs off.”

During larger storms the excess water is detained or slowed to about one-tenth of what conventional roof runoff would be. This prevents flooding and washouts, and reduces sewage problems that occur when a city’s stormwater system overflows.