Introduction to Green Building Practices

Today, the term “green” suggests being Earth-friendly or environmentally responsible. For many years we’ve lived on this planet with an attitude that there exists an endless supply of the resources necessary to our survival and comfort. Throughout history, people have seen trees grow to replace the trees we cut down, and rivers, streams, and wells refill as water is drawn from them. But fewer trees are now replacing those that are cut, and the quality of our water supply is falling. Trees and water are just two of thousands of environmental concerns today.

Eventually we’ll have to change the ways we gather, use, and dispose of natural resources. This course is designed as a “green” guide relating to one of our biggest consumptions of natural resources and energy: housing. Buildings and building construction account for about one-third of all raw material consumption, CO₂ emissions, energy consumption, and waste production. Buildings consume over 70 percent of all electrical energy.

In Lesson 1 you’ll learn the basics of green construction. You’ll see both innovative and tried-and-true construction practices come together to meet the demand for green housing—buildings that make better use of natural resources during construction and create less of an impact on the environment throughout the structure’s useful life. You’ll learn to consider the house as a system, and how new methods and materials affect the way that system consumes energy and resources while providing a healthier and more comfortable living environment.

When you complete this lesson, you’ll be able to

- Describe what’s meant by the term “green construction”
- List benefits and drawbacks of choosing green construction
- Understand the type of resources consumed during and after the construction of a residence
- Recognize where and how is energy consumed and wasted in a building
ASSIGNMENT 1

Read this introduction to Assignment 1. Then study Chapter 1, “Green Building Basics,” on pages 22 in the textbook.

Shelter is a basic necessity for all living creatures. If humans could happily live in caves and burrows, there would be no need for this course. But we choose to live in diverse regions exposed to all types of weather conditions. We construct our shelters as climate-controlled micro-environments. We want to be warm when it’s bitter cold outside and cool when the summer sun is scorching hot. We want light, clean water, and fresh air. On top of that, we want it all to be visually appealing and affordable.

It isn’t easy to provide those elements today. Depleting resources, energy cost, pollution, and population growth have created an urgent need for new ideas about how we build our shelters.

Green construction can’t be defined as one single attitude. It’s a joint venture of environmental concerns, energy conservation, long-term operating cost, health, convenience, and comfort. All these things may seem sensible and attractive, but going green has met plenty of resistance. In many cases, there have been good reasons for slow acceptance in the construction industry. Any new technology requires a period of testing and refinement. The “beta” version of green construction started in the 1970s, and it was far from perfect. The rise in fossil fuel costs immediately spurred the need to find cheaper materials to build with while paying less for heating and cooling. Environmental concerns started to be a big issue as well. New building products started to appear, like particle and wafer board sheathing, subfloor panels, plastic plumbing supply piping, foam insulation products, and fiberglass roofing. In some cases, the early releases of these efforts lead to problems. Particle and wafer board performed poorly when they got wet. Homes with polybutylene plumbing pipes had serious leaking problems. People scrambled to seal up their dwellings with foam and fiberglass insulations without regard to the effects on indoor air quality. For a while, electrical energy seemed to be the perfect fuel, with no
carbon emissions from the homes that were designed around it. The problem was, we seemed to forget that electricity is almost exclusively produced from fossil fuels.

Over the past three decades the green ideal has evolved, at times in spurts. As the cost of crude oil fluctuated, so did the push for green construction. Today it’s clear that green is here to stay and will become standard construction practice for the benefit of all. We have new products that perform as well as or better than the resource gluttons they replaced. Using these products almost always cuts the cost of construction, either directly by lower production cost or by easier or faster installation, or by reducing landfill and disposal cost at the end of the product’s life cycle. Oriented strand board (OSB) is a proven example. It’s less expensive than plywood, stays straighter, and resists water better. PEX tubing is a popular alternative to copper pressure piping. Rebonded carpet padding, which is made from small pieces of recycled foam products, lasts longer than new monolithic foam padding and extends the life of carpeting installed over it. These are just a few of many examples of materials evolved from ideas that didn’t look too promising early on.

Necessity is the mother of invention. We find a way to maintain the lifestyles we’ve been accustomed to, especially when costs skyrocket. If gasoline ever costs $25 a gallon (in today’s dollars), we’ll find a way to make a car that gets 200 miles per gallon. The construction industry is no different. When we realize that the cost and scarcity of lumber and other traditional building products, heating and cooling costs, and landfill and disposal costs are all going up, recycling and energy efficiency will become even most attractive.

After you’ve carefully read pages 2–22 in the textbook, complete Self-Check 1 and check your answers against those provided in the back of this study guide. When you’re sure you completely understand the material from Assignment 1, move on to Assignment 2.
Self-Check 1

At the end of each section of *Green Building Practices*, you’ll be asked to pause and check your understanding of what you’ve just read by completing a "Self-Check" exercise. Answering these questions will help you review what you’ve studied so far. Please complete *Self-Check 1* now.

**Indicate whether the following statements are True or False.**

_____ 1. Straw can be used as insulation but not as a load-bearing building material.

_____ 2. Rammed earth is an example of a lightweight structural building material.

_____ 3. Two-thirds of the planet is covered by water.

_____ 4. Construction waste disposal costs builders less than recycling.

_____ 5. From the beginning of the green movement, there has been a clear, uniform set of green building standards.

_____ 6. Builders are sometimes reluctant to adopt green buildings due to the risks of unproven ideas.

**Fill in the blanks.**

7. _______ is expected to bridge the gap from the oil economy to hydrogen.

8. Three main goals of green construction are energy efficiency, conservation of natural resources, and _______.

9. The city of _______ was first to include sustainable building in construction codes.

10. _______ brick homes are built with materials available on site.

**Check your answers with those on page 59.**