Watch Out for the Potential Pitfalls of Green Design

Contributed by Victor O. Schinnerer & Company Inc. August 2006

The AIA collects and disseminates Best Practices as a service to AIA members without endorsement or recommendation. Appropriate use of the information provided is the responsibility of the reader.

SUMMARY

Most building professionals lack the expertise needed to construct green or energy-efficient buildings. Green design may increase an architect's scope of services, increase construction costs, and, if properly commissioned, bolster the productivity and health of a building's tenants. A lack of knowledge about the various factors involved in green design can lead to potential legal liability. Proper training can help architects mitigate potential risk.

MOST BUILDING PROFESSIONALS LACK GREEN DESIGN EXPERTISE

While the green building share of the construction market is estimated at $15 billion annually, surveys of design professionals indicate that most architects, engineers, and contractors lack the training, experience, or technical understanding in green building methodologies to properly design and oversee green projects. In the competitive marketplace, design firms may underestimate the expertise needed and take on projects for which they are unqualified—opening a Pandora's Box of design errors and omissions. Thus, firms that offer green design must properly train their personnel.

GREEN DESIGN MAY INCREASE THE SCOPE OF SERVICES

The standard AIA owner-architect contract requires the design professional to visit the site at intervals appropriate to the state of the contractor's operations, to become generally familiar with the work, and to keep the owner informed about the progress and quality of the work. Site visits are not intended to be exhaustive nor to make the design professional responsible for the means and methods of construction.

In a green building project, however, the contractor may be unfamiliar with the building materials or methods required for Leadership in Energy and Environmental Design (LEED) Green Building Rating System® certification. Consequently the design professional must undertake more than the traditional site observation visit to ensure that the specified materials and systems are used and to verify that the contractor follows the manufacturer's installation instructions. If the architect must show the contractor how to install an item, the potential pitfall is that the architect may cross the line into supervisory responsibility of the contractor's work.

Architects also must recognize the increased responsibility and time required in both the design and contract administration phases of a green building project when determining their fees. They need to communicate this increase in the scope of services to the owner, who needs to know about the related increased cost when pursuing a green building design.

HIRE A COMMISSIONING AGENT EARLY

Building commissioning provides documented confirmation that building systems function in compliance with criteria set forth in the project documents. Building commissioning developed from the testing, adjusting, and balancing of the building's standard mechanical systems. This service, now called total building commissioning, involves every functional aspect of the building.

This is a relatively new service to the construction industry, the added expense of which owners may not want to pay. Studies have found that the total cost of commissioning, including travel expenses, ranges from 2 percent and 4 percent for buildings costing less than $5 million and from 0.5 percent to 1 percent for buildings costing more than $50 million. *(The Costs and Financial Benefits of Green Buildings.)*

In green building projects, building commissioning is especially important. The quality of construction work is crucial when dealing with a sophisticated green building design. To avoid the chance that poor installation could destroy a good design, commissioning can act as a quality-assurance process to ensure the constructed building meets the design criteria.

A commissioning agent should be hired early in the life of the project to help the design professional in selecting materials. This is particularly important if the design professional has limited experience with green buildings. The more experienced commissioning agent can also assume the design professional's observation functions during the construction phase. Because of the significant operational and maintenance (O&M) demands on a green building, the commissioning agent should help to develop the O&M manuals for the building management as well as to train the maintenance staff.

Failing to require commissioning on a complex mechanical or electrical system invites disaster. Again, the owner needs to be aware of this cost from the start.

GIVE OWNERS THE FULL PICTURE ON COSTS

Green building design and construction is often promoted as a cost-saving measure. The literature routinely states that the original investment will pay for itself within a relatively short time. The fine print discloses that these pundits evaluate savings on a life-cycle basis and minimize the significant upfront capital outlay involved in green designs. The marketing of green buildings often creates a picture inconsistent with the end result and leads the owner to believe the cost savings will be significant and easily realized.

The few studies analyzing green building costs are largely based on government building projects, which make up a majority of green buildings to date. Because government buildings generally have a longer life cycle and are funded by low-interest or public financing not available to the private sector, these studies do not accurately represent the actual costs involved in the development of a private-sector green building. Even these limited studies, however, show that the initial capital outlay for design and construction of a green building increases by as much as 7 percent to 10 percent. The costs are even higher when inexperienced design professionals and contractors are employed in the green building process.

Unwary design professionals can find themselves in a difficult situation if they have not fully explained to the owner that the initial costs in both design and construction will be higher and that there is no guarantee that the property developers will see a short-term return on their investment, if any. Many of the advertised savings, such as decreases in utility costs, are offset by the higher cost of green fixtures such as no-water urinals. Others are hard-to-measure savings, such as a reduction in the cost of moving employees within a building, and social cost reductions, such as higher productivity rates and fewer absences due to illnesses.

These types of savings may benefit the tenant but add little to the owner's bottom line. No empirical evidence shows that the rental market will pay a premium for space in a green building. Moreover, if the anticipated savings do not materialize, the owner may look to the design professional to make up the loss.

NEW TECHNOLOGIES AND MATERIALS COULD ALSO INCREASE COSTS AND RISKS

One of the driving forces behind the green building movement is the push to use new and innovative construction technologies and materials. Every new material or new application of existing materials must be thoroughly tested to determine whether it can stand up under the intended use. Long-term testing should be the standard but often is not. The usual standard is for only minimal analysis and testing, and the first projects to use the products are the beta testers. The U.S. construction industry spends only between 0.2 percent and 0.5 percent of annual sales on research and development. Consequently it is not reasonable for a design professional to accept the manufacturer's representations about its product's suitability for a particular application.

The owner and design professional should allocate resources to evaluate new materials and technologies. At a minimum, this requires checking other projects where the product has been used and comparing it to the performance of similar products. It may also require hiring independent testing laboratories at the owner's expense. The design professional must be sure that the owner is aware of these costs.

The biggest mistake a design professional can make is to accept a new product based solely upon the manufacturer's product data sheets and sales literature. Most building materials are subject to the Uniform Commercial Code's four-year limitation on product liability actions. The statute of limitations applicable to design professionals, however, generally ranges from 6 to 10 years. A review of sick-building cases reveals that it is not uncommon for materials and equipment problems to manifest several years after the building is first occupied. Consequently, if the owner or occupant cannot

obtain compensation from the manufacturer, they will look to the design professional for recovery.

A second caution for design professionals in using new products or materials concerns the manufacturers' limited warranties, which are typically for one year and limit the manufacturer's liability to the replacement cost of the item. The warranties generally exclude the cost of labor, downstream damages, and consequential damages. The design professional must tell the owner that the product is new and untested. It is suggested that the design professional obtain either a sign-off from the owner acknowledging this fact or a waiver of liability for the use of the new product.

GREEN DESIGN MAY ALSO CUT COSTS BY BOLSTERING PRODUCTIVITY AND HEALTH

Multiple chemical sensitivity involves the negative health effects on individuals from contact with common chemicals in building products. Poor indoor air quality (IAQ)—often called sick building syndrome or building-related illness—is the most-cited cause behind such health claims. These health claims have resulted in enormous jury awards. Several years ago, for example, the local government of Polk County, Fla., obtained settlements of more than $46 million from the companies involved in building a "sick" courthouse, which originally cost $34 million to build. The Environmental Protection Agency has found that poor IAQ poses a high cancer risk. According to the National Institute for Occupational Safety and Health, 20 percent to 30 percent of commercial buildings suffer from poor IAQ.

Poor IAQ has reportedly cost billions of dollars in annual costs associated with sick leave, productivity drops, and earnings losses. The use of green materials and procedures has been touted as a way to improve overall IAQ of buildings, thus reducing certain health-related liability issues. Some examples are protecting ductwork during construction, specifying finishes with low-to-zero volatile organic compounds, and right sizing heating and cooling components.

Ultimately, however, the benefits of a green design, hinge on the building being properly commissioned, operated, and maintained. If the owner does not spend the money necessary to perform these functions or the design team does not adequately specify the functions, health-related problems from poor IAQ may arise. Design professionals who do not insist that owners have an independent agent commission the building and ensure that the building's management staff is properly trained to operate and maintain the building may find themselves in a lawsuit if IAQ issues arise.

RESOURCES

More Best Practices

The following AIA Best Practices provide additional information related to this topic:

16.01.02 Green Roof Designs

16.02.05 Green Practice Tips

16.02.05 Differences in Environmentally Preferable Products

For More Information on This Topic

See also "Sustainable Building Design" by Muscoe Martin, AIA, *The Architect's Handbook of Professional Practice,* 13th edition, Chapter 18, page 656.

See also the 14th edition of the *Handbook*, which can be ordered from the AIA Bookstore by calling 800-242-3837 (option 4) or by email at bookstore@aia.org.

Feedback

The AIA welcomes member feedback on Best Practice articles. To provide feedback on this article, please contact bestpractices@aia.org.

Key Terms

- Building performance
- Sustainability
- Sustainable business practices

Victor O. Schinnerer & Company, Inc.
Two Wisconsin Circle
Chevy Chase, MD 20815-7022
301-951-9746
www.planetAEC.com

Portions of this Best Practice are a contribution of Victor O. Schinnerer & Company, program administrators of the AIA Commended Professional Liability Insurance Program.