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The Designer's Role in Sustainability.

(This article is an excerpt from one of five white papers on topics in sustainable design: Beyond Interior Design, Indoor Air Quality, Selling Green, Materials and Products, and Reference Guide. The full text white papers may be ordered at www.asid.org)

Interior design doesn't exist in a vacuum. It is an integral part of any building construction or renovation project. Building interiors are fitted with materials, products and systems from a network of raw materials that stretches around the globe. Occupants of those interiors use energy and other resources in ways that are driven, at least in part, by the design of the space itself. Good interior design, and especially sustainable interior design, must be informed by all these interconnections and impacts.

Buildings, their supporting infrastructure and their associated maintenance represent an enormous proportion of mankind's direct and indirect impact upon the environment. Although the total impact of buildings goes far beyond energy use, the construction and operation of residential and commercial buildings consumed 40 percent of the energy and 72 percent of electricity produced in the United States in 2003.

Buildings and their interiors also are responsible for widespread depletion of natural resources, including the use of land, raw materials and water. Recent surveys show that rural land is being converted to roads, buildings and industrial uses at the rate of approximately 2.2 million acres per year. Nationally, it is estimated that 408 billion gallons of water were withdrawn from natural sources for use during 2000. Further, the construction, operation, maintenance and renovation of buildings and interiors generates waste and pollution in many forms, creating local and global changes.

Sustainable design is a way of thinking that considers the impact of these issues on the environment and on human health in the context of building and construction. By taking an informed approach to the way design decisions are made, beginning with an understanding of how every choice affects the environment, designers can begin to help mitigate these impacts. Interior design is a key aspect of any green building process. It is the design discipline that is most explicitly concerned with how people will experience their built environments and therefore has huge implications for human health, well-being and productivity, all central tenets of sustainable design.

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Integrated design is a collaborative design process that has two sides: one, the recognition of the interconnectedness of different building systems, and two, extending that same recognition by seeing how professionals who are responsible for different building systems have important information to offer each other.

For both the interior space and the building as a whole to perform optimally, interior design cannot be seen as a separate, isolated discipline, but needs to be an integral part of the overall design approach. The interior designer on a residential or commercial project should be engaged as a key participant from the beginning of the design process, and can contribute to decisions related to site selection, orientation, massing, and mechanical and electrical system design with an understanding of how those choices will affect spaces inside the building.

Since understanding the complexities of different building components and systems requires specialized knowledge, specialized roles have been created around the design, construction and maintenance of buildings and interiors. The roles can include those of the architect, interior designer, MEP (mechanical, electrical and plumbing) engineer and general contractor. In a large and complex project, many more roles can exist.

Although the design of any building or interior requires the work of all of these professionals, the design process traditionally has not been collaborative.

Traditional Design

Traditional design is a linear process in which no team member is fully cognizant of the methodologies and goals of other members. When one member of the project team completes a portion of the project, the drawings are handed off to the next member of the team to complete the next portion, and so on.

For example, once the architect has completed the schematic design, the structural engineer "engineers" the building in accordance with the preliminary drawings, then the mechanical engineer designs the building systems within the constraints that resulted from these schematics. Finally, the interior designer receives the drawings, too late to provide feedback about most aspects of the building's design. At this stage, it would be both time consuming and expensive to make changes to the baseline documents, so many opportunities to tailor the interior design are lost.

The traditional design process is good at producing buildings that achieve conventional performance levels. But if a project's goals include high-energy performance and exceptional human comfort and health, this process, even when each individual has good intentions, fails to capitalize on opportunities to bridge different areas of expertise. For example, the architect may design a building with large expanses of south-facing windows, which can benefit the building's lighting and heating. By the time the MEP engineer sees the design, however, it is too late to add exterior light shelves to limit glare and heat gain during the hottest times of day. Instead, a larger HVAC system must be engineered to compensate for the likelihood of enormous heat gain associated with the large southern exposure.

Or, the interior designer may have wanted to specify raised access floors with underfloor air distribution as a strategy for a flexible office layout, but the engineer has already specified a detailed ventilation system using the ceiling plenum for distribution. Nor did the designer have the opportunity to suggest to the architect a different module size for the building's structural system that might work more efficiently with the client's existing system's furniture, allow for greater daylighting potential, and use less interior space.

In this traditional approach, the architect, engineer, interior designer and client may never sit down together to discuss and understand the goals of the project. As a result, individual team members typically end up inadvertently working at cross purposes.

Integrated Design

In contrast to a traditional design process, integrated design is a collaborative approach that recognizes the relationships between building systems and between the team members that design and install those systems. Integrated design requires participation of all members of a project team in order to optimize the performance of the building and the way in which it is built.

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Integrated design often begins with a charrette, a group brainstorming session to kick off the project design with a forum for articulating goals and sharing ideas. The charrette is an excellent time to bring in the early and active participation of the full design and construction team. Many of these participants are not traditionally included in the early phases of design, but the process is exponentially enhanced with their involvement.

When the team is selected and brought together for the first time, perhaps the most important objectives are to understand the basic project goals and to establish a consistent, collaborative process that will support those goals throughout the duration of the project.

Working in tandem from the outset enables each team member to question assumptions and to develop coordinated solutions that result in better building designs, wise budgeting and well-documented construction documents. Through the early communication and meetings, everybody's input and expertise is used to inform the design, rather than allowing one perspective to impose design solutions on the rest of the team. Team members learn from each other and set priorities and goals that allow them to see the whole picture in development, as well as to intervene in a timely manner when the design or objectives seem to be at risk as the design progresses.

The Integrated Design Team

On a commercial project, typical members of an integrated design team include:

- Architect
- Civil engineer
- Commissioning authority
- Contractor
- Cost estimator
- Facility/maintenance manager
- Interior designer
- Landscape architect
- Lighting consultant
- MEP engineer
- Owner
- Specifications writer
- Structural engineer
- Tenant or occupants representative
- Other consultants with special expertise

The contractor or builder should be part of the team from the beginning. Generally this is not possible when a competitive bid process is contemplated. However, in a negotiated contract, the contractor is usually selected early and so may be able to participate in the charrette.

Integrated Design and Sustainability

When green building features are viewed as simply another step in the design process, or an "add on," the resulting design often has lower levels of environmental performance and higher cost. If a client wants to reduce energy use, it is far more effective to design for energy conservation from the beginning of a project with, for example, site selection that reduces heating and cooling needs, than to spend a lot of additional money in retroactively insulating the building or reengineering it to use less energy.

Many, if not all, of the major design decisions that most affect the sustainable performance of a building are made in the early phases of design. Some early decisions that can have large environmental impacts include site selection, building orientation, fenestration, and shell and glazing choices. With integrated design, the full team of professionals can provide early input on these decisions. If the architect is pursuing a day-lighting strategy, for example, the interior designer can contribute layout, lighting and color schemes that complement that strategy. Without early knowledge of the project goals, the designer may have pursued plans that would make the day-lighting strategy less effective, which would, in turn, have increased energy needs and decreased occupant satisfaction. Another strategy with environmental benefits that calls for an integrated design process is the use of exposed thermal mass. Exposed concrete, brick or stone walls, and roof structures can reduce peak cooling loads, especially when coupled with a night-flushing system that expels the building's heat and uses the naturally colder nighttime air to cool the mass. Implementing such a strategy requires collaboration among the architect, structural engineer, mechanical engineer and interior designer.

No matter what kind of project the interior designer is working on, whether commercial or residential, the designer faces a number of constraints, including financial limits and scheduling requirements. The integrated design process can help the designer meet the challenge of incorporating sustainable design into his or her everyday practice on projects of all sizes.

The Role of the Commercial Interior Designer

A number of items that are central to the interior designer's work affect the building's energy use and system design, including the floor plan, partition design, lighting design and interior finishes. The choice of interior finishes and design can also affect indoor air quality, building maintenance, acoustics and occupant comfort. The integrated design process gives the interior designer the opportunity to discuss how design choices will affect other building systems, and for the designer to adapt to building systems choices made by other team members. In one project meeting, an integrated design team made the connection between the reflectivity of interior paint and the number and type of lighting fixtures necessary for the interior. Because the interior designer guided the team to select a paint color with a high reflectivity, the lighting engineer was able to significantly reduce the number of lighting fixtures needed. As a result, the HVAC engineer was able to reevaluate, and ultimately reduce, the size of the HVAC system. This series of choices —none of which could have been made without the other—led to a higher quality of interior light, reduced energy costs, reduced heat load, and reduced installation and maintenance costs for the HVAC and lighting systems.

Beyond Design and Construction

In addition to their key roles during design and construction, designers can play an important role post construction and post occupancy. Interior designers have a unique role in creating the spaces that occupants use daily, and by maintaining a relationship with the owner over time both the designer and the occupants can benefit.

Occupant feedback can provide insight into which sustainable strategies worked well and which were less successful in a project. The designer can use that feedback to improve the design of subsequent projects and to avoid repeating mistakes.

Receiving occasional access to a completed project for walk-throughs with potential new clients provides a way of displaying successfully completed work. Prospective clients will benefit by seeing a designer's work first hand, as well as seeing the goodwill between the designer and the owner.

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A successful completed project that embodies environmental and human health features helps demostrate to everyone involved in the project, and to prospective clients, that sustainable design is simply good design. An office, hospital or home does not have to look or feel different to be an environmentally friendly project. An effective project usually demonstrates, in fact, how sustainable design, with features such as enhanced natural lighting, good indoor air quality and thermal comfort, looks and feels better than a conventional project.

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