The Components of Whole Building Design

Whole Building Design consists of two components: an **integrated design approach** and an **integrated team process**. The "integrated" design approach asks all the members of the building stakeholder community, and the technical planning, design, and construction team to look at the project objectives, and building materials, systems, and assemblies from many different perspectives. This approach is a deviation from the typical planning and design process of relying on the expertise of specialists who work in their respective specialties somewhat isolated from each other.

Whole Building design in practice also requires an integrated team process in which the design team and all affected stakeholders work together throughout the project phases and to evaluate the design for cost, quality-of-life, future flexibility, efficiency; overall environmental impact; productivity, creativity; and how the occupants will be enlivened. The 'Whole Buildings' process draws from the knowledge pool of all the stakeholders across the life cycle of the project, from defining the need for a building, through planning, design, construction, building occupancy, and operations.

The Integrated Design Approach

Each design objective is significantly important in any project, yet a truly successful one is where project goals are identified early on and held in proper balance during the design process; and where their interrelationships and interdependencies with all building systems are understood, evaluated, appropriately applied, and coordinated concurrently from the planning and programming phase. A high-performance building cannot be achieved unless the integrated design approach is employed.

Design Objectives of Whole Building Design

In buildings, to achieve a truly successful holistic project, these design objectives must be considered in concert with each other:

- **Accessible**: Pertains to building elements, heights and clearances implemented to address the specific needs of disabled people.
- **Aesthetics**: Pertains to the physical appearance and image of building elements and spaces as well as the integrated design process.
- **Cost-Effective**: Pertains to selecting building elements on the basis of life-cycle costs (weighing options during concepts, design development, and value engineering) as well as basic cost estimating and budget control.
- **Functional/Operational**: Pertains to functional programming—spatial needs and requirements, system performance as well as durability and efficient maintenance of building elements.
- **Historic Preservation**: Pertains to specific actions within a historic district or affecting a historic building whereby building elements and strategies are classifiable into one of the four approaches: preservation, rehabilitation, restoration, or reconstruction.
- **Productive**: Pertains to occupants' well-being—physical and psychological comfort—including building elements such as air distribution, lighting, workspaces, systems, and technology.
- **Secure/Safe**: Pertains to the physical protection of occupants and assets from man-made and natural hazards.
- **Sustainable**: Pertains to environmental performance of building elements and strategies.

The Integrated Team Process

To create a successful high-performance building, an interactive approach to the design process is required. It means all the stakeholders—everyone involved in the planning, design, use, construction, operation, and maintenance of the facility—must fully understand the issues and concerns of all the other parties and interact closely throughout all phases of the project. (See Engage the Integrated Design Process.)

A design charrette—a focused and collaborative brainstorming session held at the beginning of a project—encourages an exchange of ideas and information and allows truly integrated design solutions to take form. Team members—all the stakeholders—are encouraged to cross fertilize and address problems beyond their field of expertise. The charrette is particularly helpful in complex situations where many people represent the interests of the client and conflicting needs and constituencies. Participants are educated about the issues and resolution enables them to "buy into" the schematic solutions. A final solution isn't necessarily produced, but important, often interdependent, issues are explored. (See Planning and Conducting Integrated Design Charrettes.)

It is not enough to design the project in a holistic manner. It is also important to determine the effectiveness and outcome of the integrated design solution. Consider conducting a Facility Performance Evaluation to ensure that the high-performance goals have been met and will continue to be met over the life cycle of the project. Consider retrocommissioning to ensure that the building will continue to optimally perform through continual adjustments. See Building Commissioning and Document Compliance and Acceptance.

A Holistic Design Philosophy

The concept of "wholes" is not new. In 1926, Jan Christian Smuts, a South African Prime Minister and philosopher, coined the term "holism". He believed that there are no individual parts in nature, only patterns and arrangements that contribute to the whole. Buckminster Fuller also said back in 1969 while working on the space program: "Synergy is the only word in our language that means behavior of whole systems, unpredicted by the separately observed behaviors of the system's parts or any subassembly of the system's parts."

The Whole is Greater than the Sum of its Parts

Whole Building Design provides the strategies to achieve a true high-performance building: one that is cost-effective over its entire life cycle, safe, secure, accessible, flexible, aesthetic, productive, and sustainable.

Through a systematic analysis of these interdependencies, and leveraging whole building design strategies to achieve multiple benefits, a much more efficient and cost-effective building can be produced. For example, the choice of a mechanical system might impact the quality of the air in the building, the ease of maintenance, global climate change, operating costs, fuel choice, and whether the windows of a building are operable. In turn, the size of the mechanical system will depend on factors such as, the type of lighting and controls used, how much natural daylight is brought in, how the space is organized, the facility's operating hours, and the local microclimate. At the same time, these same materials and systems choices may have an impact on the aesthetics, accessibility, and security of the project. A successful Whole Building Design is a solution that is greater than the sum of its parts.

Excerpted from the Whole Building Design Guide

http://www.wbdg.org/wbdg_approach.php

Whole Building Design

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Last updated: 08-07-2008