FREE THE GREEN STUDIO HANDBOOK: ENVIRONMENTAL STRATEGIES FOR SCHEMATIC DESIGN PDF

Alison G. Kwok,Walter T. Grondzik | 436 pages | 18 Jul 2011 | Taylor & Francis Ltd | 9780080890524 | English | Oxford, United Kingdom

The Green Studio Handbook

To browse Academia. Skip to main content. Log In Sign Up. Download Free PDF. Alison Kwok. Kwok, Ph. Grondzik, P.

This paper provides an overview of The Green Studio Handbook, recently published as a resource for designers seeking clear guidelines for integrating green design strategies into the conceptual and schematic phases of design. The book contains a discussion of the integration of green strategies and how building form, orientation, and spatial layout are critical to the proper performance of certain green strategies; 40 green design strategies in six broad topic areas, each providing a catalog of information for common strategies that must be implemented at the schematic design phase; and nine case studies that show how various green strategies work together in a finished building.

This paper provides excerpts of several design strategies and one case study and suggests a variety of ways that the book may be used. Gesture sketches are refined and further developed. Green design strategies are commonly relegated to magic arrows to show air flow or yellow lines to show the path of the sun or flux of light. Often, design hypotheses are left untested or unquestioned simply because there is no readily available method or means to appropriately size The Green Studio Handbook: Environmental Strategies for Schematic Design for cross ventilation or determine how much light will enter a room under particular sky conditions.

This paper gives an overview of The Green Studio Handbook: Environmental Strategies for Schematic Design number of green design strategies and case studies from a recently published work—The Green Studio Handbook Architectural Press: Oxford, —which is offered as a resource to assist students and practitioners in integrating green strategies into the beginning stages of design.

The Green Studio Handbook presents guidelines for the application of selected environmental strategies during the schematic design of green buildings. The Handbook provides a discussion of green design at the schematic design phase The Green Studio Handbook: Environmental Strategies for Schematic Design an essay on integrated design. The majority of the book is devoted to 40 design strategies, each providing: brief descriptions of principles and concepts, step-by-step approaches for integrating the strategy into the early stages of design, annotated tables and charts to assist with preliminary design sizing, key issues to be aware of when implementing the strategy, and references to further resources.

This information is reinforced with conceptual sketches and photos illustrating each strategy. A chapter with case studies of several green building projects provides context for the strategies presented. The rationale for this book arose from an observed need for a resource that could provide a concise catalog of information for a range of green strategies to help the designer not only understand how each strategy functions, but also offer data, information, and a sequence of design steps to give a preliminary estimate of sizing, appropriateness, and links to related strategies.

The fundamental premise of this book is The Green Studio Handbook: Environmental Strategies for Schematic Design if appropriate strategies are not included during the schematic design phase of a project, they may never be included since many such strategies are demandingly form-giving. Poor decisions related to building orientation, massing, and layout are nearly impossible to rectify in later design phases in an attempt to back-integrate high performance daylighting, passive heating, or The Green Studio Handbook: Environmental Strategies for Schematic Design cooling systems.

The green design process, by necessity, requires the designer at least in the early schematic stages to assume a greater than normal degree of expertise in several technical areas in order to pursue an integrated design. This necessity also represents an opportunity for innovation.

The first sketches or outlines, a plan of action, a systematic or organized framework can provide the opportunity to define goals and to set criteria that will benchmark success.

This is the time to set a direction for form and to gather ideas and concepts. It is not the time, however, to close the mind and crystallize all relationships.

The initial steps toward achieving an integrated design, such as forming a team with a shared set of green goals and a desire for innovation and learningis the territory wherein green strategies are initially discussed, The Green Studio Handbook: Environmental Strategies for Schematic Design, and integrated. Opportunities for many of green strategies will be lost forever if not incorporated during schematic design.

It should be decided whether the building will perform to minimum standards as embodied in building The Green Studio Handbook: Environmental Strategies for Schematic Design or will strive to surpass them—which must be the case for a green building. What kinds of performance will be emphasized: energy efficiency, quality of light, or air quality?

What degree of green design is to be considered? The intentions must be clear because they point to the refinements of process, the type of team, and the potential strategies and technologies that will be most appropriate for a given project.

Sometimes, a charismatic and knowledgeable team member can convert others to a deep green commitment. What is really meant by green? Who decides; and on what basis? Criteria can be derived from quantitative standards such as energy efficiency or from qualitative values such as a desired lighting effect.

Criteria should be realistic so they can be met; they should also be stringent enough to provide a challenge and meet design intent. The way a designer frames issues speaks to the outcomes. More importantly, a knowledge-based profession reflects upon previous efforts and specifically learns from successes and failures. Collapses occurred during the construction of Chartres. Calculations and formulations about how materials work under the forces of gravity were rethought and the building of the famous cathedral continued.

Knowledge-based design is also needed when dealing with environmental forces, although they are often more subtle, complex, and variable than gravity. A different type of feedback loop is required, one not founded upon collapse, but one that is part of an integrated process— involving learning from others The Green Studio Handbook: Environmental Strategies for Schematic Design learning from analysis.

The analysis of an existing project as a precedent or case study informs the development of hypotheses of how things should work on future The Green Studio Handbook: Environmental Strategies for Schematic Design. Prioritizing goals helps the designer and client to understand what is most important, what can be discarded, and how flexible are proposed solutions. As with any design process, one works through sets of ideas to get to a clarification of goals. This is particularly important with green design because one strategy can negate or conflict with another.

Traditional passive solar design uses solar-oriented glazing in combination with thermal mass to provide heating. Windows, however, must be carefully sized and arranged to provide a balance between the correct amount of thermal resistance, light admittance, and solar collection. To arrive at a daylighting strategy, appropriate lighting level criteria should be established based upon the functions and needs of the various spaces, then potential solutions proposed, tested, and evaluated using daylighting models or other available tools.

Such studies should provide for distinct lighting effects—and result in a distinct building form. Passive strategies adjust to environmental conditions primarily through the architecture and should be considered before active. This means that the architect must be strategic.

It means using the resources on site rather than importing energy from a remote source. There are both active and passive strategies, but many more passive strategies are included since they require early implementation during the design process and are typically more form-shaping. Many green strategies such as material finishes are not included as they have virtually no impact on schematic design decisions.

The book is not a catalog of green design strategies—it is a catalog of green strategies for schematic design. Green roofs are of two basic types: extensive and intensive. Extensive green roofs have a relatively shallow soil base, making them lighter, less expensive, and generally easier to maintain than intensive green roofs.

Extensive roofs usually have limited plant diversity, typically consisting of sedum succulentsgrasses, mosses, and herbs. Extensive green roofs can work at slopes of up to 35 degrees, although slopes above 20 degrees require installation of a baffle system to prevent soil slump. These roofs can be used in both urban and rural settings, are applicable to a wide variety of building types, and can be used in both new and existing construction.

Shading from adjacent buildings or trees can have a big impact on the success of rooftop plantings. Building massing can also be used to create rooftop surfaces that are relatively protected from wind. Building form will also determine how building occupants can interact with a green roof. A green roof is a user amenity only if it is at least visible to occupants. If it is also accessible to building The Green Studio Handbook: Environmental Strategies for Schematic Design, greater integration of the green roof with appropriate interior spaces is desirable.

Structural system design, careful detailing of drainage systems, irrigation systems, and penetrations of the roof membrane are key concerns. Cross ventilation is a viable and energy-efficient alternative to mechanical active cooling under appropriate climate conditions. The design may focus upon direct cooling of occupants as a result of increased air speed and lowered interior air temperature or upon the cooling of building surfaces as with nighttime flushing to provide indirect comfort cooling.

Air speed is critical to direct comfort cooling; air flow rate is critical to structural cooling. The effectiveness of cross ventilation is a function of the size of the inlets, outlets, wind speed, and outdoor air temperature.

Cross ventilation cooling capacity is fundamentally dependent upon the temperature difference between the indoor air and outdoor air. Lesser temperature differences provide only marginal cooling effect circulating air at room temperature, for example, cannot remove heat or reduce room temperature.

Outdoor air flow rate is another key capacity determinant. The greater the air flow, the greater the cooling capacity. Buildings are typically best naturally-ventilated when they are very open to breezes yet shaded from direct solar radiation. Building materials in a cross ventilated building may be light in weight, unless night ventilation of mass is intended—in which case thermally massive materials are necessary.

An ideal building footprint is an elongated rectangle with no internal divisions. Siting should avoid external obstructions to wind flow such as trees, bushes, or other buildings. On the other hand, proper placement of vegetation, berms, or wing walls can channel and enhance airflow to windward inlet openings. At high outdoor air temperatures, cross ventilation may still be a viable comfort strategy if air flow is directed across the occupants so they experience higher air speeds.

Cross ventilation for nighttime structural cooling when adequate wind speed exists should be directed to maximize contact with thermally massive surfaces. A design caution: high outdoor relative humidity may compromise occupant comfort even when adequate sensible cooling capacity is available. An exit opening equal in size to the inlet opening is necessary. This procedure considers only sensible loads and calculates the size of the inlet assuming an equal sized outlet.

Arrange spaces to account for the fact that building occupants will find spaces near inlets outdoor air to be cooler than spaces near outlets warmed air. Substantial heat sources should be placed near outlets, not near inlets. State the design cooling load on a unit floor area basis. Establish the ventilation inlet area this is The Green Studio Handbook: Environmental Strategies for Schematic Design area, adjusted for the actual area of window that can be opened and the estimated impact of insect screens, mullions, shading devices and the floor area of the space that will be cooled.

The inlet area may be based upon other design decisions such as view or be a trial and error start to cooling system analysis. Using Figure 2 see belowfind the intersection of the inlet area percentage Step 5 and the design wind speed from local climate data. This intersection gives the estimated cross ventilation cooling capacity—assuming a 3oF [1.

Design wind speed should represent a wind speed that is likely to be available during the time of design cooling load. Compare estimated cooling capacity Step 6 with the required cooling capacity Step 3.

Increase the proposed inlet area as required to achieve the necessary capacity; decrease the proposed inlet area as required to reduce excess cooling capacity. On the other hand, greater temperature differences will exist during the cooling season permitting a reduction in inlet and outlet size under such conditions. Extrapolation for higher wind speeds is not recommended due to discomfort from too-high indoor air The Green Studio Handbook: Environmental Strategies for Schematic Design.

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Learn how to enable JavaScript on your browser. The Green Studio Handbook remains an essential resource for design studios and professional practice. This extensive and user-friendly tool presents practical guidelines for the application of green strategies during the schematic design of buildings. Students and professionals can quickly get up to speed on system viability and sizing.

Each of forty-three environmental strategies includes a brief description of principles and concepts, step-by-step guidance for integrating the strategy during the early stages of design, annotated tables and charts to assist with preliminary sizing, key issues to consider when implementing the strategy, and pointers to further resources. Ten new in-depth case studies illustrate diverse and successful green buildings integrated design projects and how the whole process comes together This third edition features updated tables and charts that will help to save energy, water, and material resources during the early stages of design.

More than sketches and full-color images illustrate how to successfully apply strategies. A glossary, a project index listing buildings in 20 countries, updated tables and drawings, and I-P and SI units increase the usefulness of The Green Studio Handbook. Alison G. KwokPh. He has also taught in architecture and architectural engineering programs in Florida, Oklahoma, Oregon, and Saudi Arabia. Read an excerpt of this book!

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