

PART I DESIGN FACTORS

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THE LIGHTING DESIGN PROCESS

Lighting design is a process. It is the process of integrating light into the fabric of architecture. Successful lighting solutions vary with each distinct building type and the particular needs of each project. Regardless of the space to be lighted—an office, classroom, gallery, restaurant, home, store—and regardless of the light sources available for use, the process is always the same.

Because lighting design is a process, it can be learned. This book traces the steps in the lighting design process much as a professional performs them in practice. Design, of course, is not always a linear process. At times some of these steps are performed simultaneously. Yet in large part the order of the material corresponds to professional practice.

This book does not describe *the* lighting design process; it describes *a* lighting design process—one that has been used successfully to provide effective solutions for thousands of architectural projects around the world. It is a process built upon the premise that the lighting condition has enormous emotional, psychological, and physiological impact on people.

A common mistake when providing light for buildings is to select the lighting equipment first. Selecting luminaires is the last step in the process. What is important is not what *makes* the light, but rather which objects and surfaces *receive* it. The key to successful lighting design is to decide what you want to light first, and then work backward to determine the solution.

1. The lighting design process begins with a thorough understanding of the human visual system: how the eye and brain work together to create our perception of the world around us. The higher the quality of information provided to the brain, the better the brain is able to interpret its surrounding environment (Chapter 2).
2. A foundation in photobiology and the nonvisual effects of electric light is now essential to the proper use of light in buildings (Chapter 3).

3. Next you establish the emotional background that is most attuned to the occupants and tasks to be performed. Much in the way you select background music to support the activities and environment of a room—classical music, jazz, or indie rock, for example—you establish the lighting composition to create a supporting psychological environment (Chapter 4).
4. The direction and distribution of light and patterns of brightness create the desired emotional environment and ensure that a comfortable visual experience is the result (Chapter 5).
5. Next, the designer selects the color spectrum suitable for the occupants and activities, with sensitivity to the color palette of the interior surface finishes and furnishings (Chapter 6).
6. Preliminary calculations are made to understand the quantity of light that is necessary and appropriate for the tasks, and that permits quick, accurate, and comfortable seeing (Chapter 7).
7. The available daylight is considered, not only because its use in interiors greatly reduces the power consumed by electric lighting but, equally importantly, because light from the sun and sky and views to the exterior significantly enhance the quality of the interior environment and our satisfaction with it (Chapter 8).
8. Only at this point, after the above considerations are carefully assessed and preliminary design decisions made, are you ready to select the electric light source(s) appropriate for each particular interior environment. In this text, light sources are presented in their approximate order of introduction to the marketplace, which roughly corresponds to their increasing initial cost.

Like many twenty-first-century global corporations, which have increasing responsibility to their shareholders, the marketing departments of most lighting manufacturers emphasize products with the highest profit margins, not necessarily those that provide the highest quality of light. It is essential that you be able to evaluate the relative merits of the different sources available based on their physiological and psychological impacts and benefits to the end user (Chapters 9–13).

9. Almost all electric sources generate light in a distribution poorly suited to architectural lighting. Methods of optical control of the primary light source are established next (Chapter 14).
10. With the light source(s) and method(s) of optical control determined, you now have all of the information at hand to select from the wide range of luminaires available in the marketplace the specific ones that will achieve your desired objectives (Chapter 15).
11. At last, you are in a position to create the lighting design and the lighting layout that communicates it. “Sustainable design” is and has always been one of the cornerstones of effective lighting practice—using the fewest number of watts

to provide the optimum quantity and highest quality of light and, therefore, the maximum benefits to the occupants. All successful lighting design is sustainable design.

Design is rarely accomplished on the first attempt. The “best” solution to a design problem seldom presents itself immediately; it is far more likely to be discovered on the fifth or tenth try. Design requires the patience to make multiple attempts. And your final solutions are only applicable to the particular needs of that project. The design process begins all over again with the next project (Chapter 16).

12. Every lighting design must be verified with computer-aided photometric calculations to ensure that the target illuminance values are met. Creating full-size mock-ups, building scale models, and making post-occupancy evaluations are among other methods designers might use to verify that their design will work (Chapter 17).
13. Upon completion of the lighting design and lighting layouts, the switching controls, dimming controls, and energy management systems are evaluated and selected (Chapter 18).
14. Finally, construction documents are produced that contain the designer's complete written and drawn plans and specifications to communicate with the utmost clarity all of the information required by the installing contractor to deliver the designer's intent (Chapter 19).

This architectural lighting design process yields an environment where casual observers are unaware of the mechanics of light production; they perceive only a comfortable environment that supports their activities and enhances their well-being. With practice, the designer learns to apply this process in ways that go even further, creating environments that stimulate the mind and inspire the spirit.