ANSI/IES LP-1-20

Illuminating
ENGINEERING SOCIETY

LIGHTING PRACTICE:
DESIGNING QUALITY LIGHTING FOR PEOPLE AND BUILDINGS

AN AMERICAN NATIONAL STANDARD

Approved American National Standard
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Foreword

Humans' relationship to their surroundings is directly related to the quality of the lighted environment. When the light is right, people can see more deeply into the world. Quality lighting enhances the ability to see and interpret the world, supporting a sense of well-being and improving people's capability to communicate with each other.

Because lighting is vital for vision, activity, and perception, it is critical to provide a quality lighted environment for people who use lighting systems for work or leisure.

ANSI/IES LP-1-20, Lighting Practice: Designing Quality Lighting for People and Buildings was developed (originally as DG-18-08 and updated as DG-18-18) to introduce architects, lighting designers, design engineers, interior designers and other lighting professionals to the principles of quality lighting design. These principles, related to visual performance, energy and economics, and aesthetics, can be applied to a wide range of interior and exterior spaces to aid designers in providing high-quality lighting to their projects.

The text is divided into four parts. Part I: Light + Human Needs (Sections 1 through 5) describes the principles and technical background involved in designing lighting that satisfies vision and visual comfort needs. Part II: Light + Economics and Environment (Sections 6 through 10) deals with economic and environmental factors related to quality design. Part III: Light + Architecture (Sections 11 through 15) deals with lighting the built environment. And Part IV: Light + Application (Sections 16 and 17) presents an applications guide and a list of questions that provide a checklist to identify issues critical to a specific project.

LP-1-20 is illustrated with sketches and photographs to enhance understanding of key principles and provide examples of applications. The illustrations portray many typical applications as well as some more-glamorous installations.

This document focuses on design principles but defines key technical terms and includes technical background in the form of sidebars to aid understanding.

In addition, other technical papers and IES publications are referenced that can provide additional research background, detail, or specific design guidance. These documents, listed in the **References** section, provide an extensive background of technical lighting knowledge and access to the latest research influencing humans' understanding of light.

Quality lighting design distinguishes the designer, provides full value to the client, and supports the design intent. LP-1-20 will introduce the reader to the principles and background involved in achieving this level of lighting for people and buildings.

Part 1:
Light + Human Needs

To love beauty is to see light.
– Victor Hugo

1.0 Light + Quality

Following the light of the sun, we left the Old World.
– Christopher Columbus

Vision and light enable humans to understand the physical universe. Light is the portal through which the eye, and thereby the human mind, interacts with the world, and is therefore capable of creating worlds of perception. Based on this understanding of light as a medium, the composition of light in a space can inspire a wide range of psychological and even physiological responses in humans.

Throughout the ages, people spent most of their time outdoors and relied on sunlight, moonlight, starlight, firelight. During the day, people had little control over the lighting that they were given from nature, but it was dynamic. The moving sun continually created subtle changes in the landscape, revealing and obscuring texture and detail through light and shadow, color and brightness.

Today, people in industrialized nations spend most of their lives indoors and rely on electric light as their medium to interpret architectural environments. Electric light enables designers to control the medium, use it for communication, and thereby inspire different perceptions and achieve a range of functional and aesthetic goals.

Good lighting provides sufficient illumination for people to see and perform visual tasks; it can also draw attention, influence social interaction, foster mood and atmosphere, beautify space and architecture, promote safety and security, increase comfort, and contribute to task performance. Poor lighting can have the opposite effects.

1.1 Human Needs Served by Lighting

Figure 1-1 illustrates the many human needs served by lighting.

1.1.1 Task Visibility. Task visibility is essential to lighting design; lighting exists to enable vision. Recognition of this fact led to an emphasis on visibility above all other lighting design goals in the past, resulting in a high level of understanding of visibility and its importance.

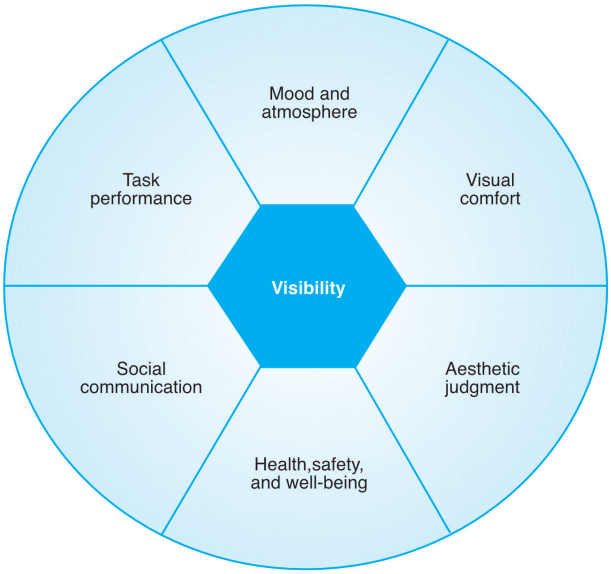

Figure 1-1. Human needs served by lighting.
(© Illuminating Engineering Society)

1.1.2 Task Performance. Task performance involves occupants interacting with objects in a space, whether it is a person washing his or her hands, reading numbers posted in a corridor, analyzing the details in an etching, or any other task. While lighting is a critical component of visual performance, visual performance in turn is only one of several influences on task performance along with training, motivation, motor skills, and other factors.[1,2]

1.1.3 Mood and Atmosphere. These concepts reflect emotional response to a luminous environment.[3] Lighting design can have a direct impact on many aspects of human experience, including relaxation, stimulation, preference, and sense of safety. These mood states in turn may influence task performance.

1.1.4 Visual Comfort. Visual comfort can affect task performance, health and safety, and mood and atmosphere. Lighting conditions that cause visual discomfort can lead to headaches and eyestrain. Visual discomfort and its effects are often dependent on the context of the application. For example, office workers often find themselves more fatigued under a glaring lighting installation, while dancers in a nightclub might find glare an enhancement to the dancing experience.