Illuminating Engineering Society

ANSI/IES RP-8-18
+ADDENDUM 1

RECOMMENDED PRACTICE FOR DESIGN AND MAINTENANCE OF ROADWAY AND PARKING FACILITY LIGHTING

Approved American National Standard
ANSI

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ANSI/IES RP-8-18
+ADDENDUM 1

Recommended Practice for Lighting Roadway and Parking Facilities

Publication of this Recommended Practice
has been approved by the IES.
Suggestions for revisions
should be directed to IES.

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The Roadway Lighting Committee

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Dedication:

This roadway lighting Recommended Practice is dedicated to the memory of Jon Hart, whose many contributions to the committee and the IES are greatly appreciated.

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For ANSI/IES Continuous Maintenance Forms, please use this link: www.ies.org/standards

Introduction to This Recommended Practice

ANSI/IES RP-8-18 is a substantial revision to previous versions of ANSI/IES RP-8 in that it is an aggregation of several IES Standards covering roadway and parking facility lighting. This document supersedes the following IES Standards:

- RP-8-14, *Roadway Lighting*
- RP-20-14, *Lighting for Parking Facilities* (revised 2016)
- RP-22-11, *Tunnel Lighting*
- DG-4-14, *Design Guide for Roadway Lighting Maintenance*
- DG-19-08, *Design Guide for Roundabout Lighting*
- DG-21-15, *Design Guide for Residential Street Lighting*
- DG-23-14, *Design Guide for Toll Plazas*
- DG-26-16, *Design Guide for Lighting the Roadway in Work Zones*
- DG-28-15, *Design Guide for Selection, Installation, Operations and Maintenance of Roadway Lighting Control Systems*
- LM-50-13, *Photometric Measurement of Roadway and Street Lighting Installations*
- LM-71-14, *Photometric Measurement of Tunnel Lighting Installations*
- TM-10-00(R2011), *Addressing Obtrusive Light (Urban Sky Glow and Light Trespass) in Conjunction with Roadway Lighting*

This Recommended Practice is a compilation of lighting design techniques and criteria, all offered for quality roadway lighting solutions. Each chapter should not be taken in isolation but used as a whole for quality lighting design for roadways and other environments where vehicles are present, such as tunnels, intersections, and parking lots.

A lighting designer will often simplify the design criteria to lighting level and uniformity. However, impacts on visual quality go beyond these simple criteria and encompass minimizing glare and providing spectral contrast on pedestrians, hazards, and other vehicles. All design criteria are important in order to achieve these goals

1. Improve motorist visual quality
2. Provide quality light and increased contrast for seeing hazards
3. Illuminate conflict areas
4. Minimize environmental impacts of light at night
5. Employ lighting systems that are easily maintained and minimize energy use

This Standard was prepared with the objective of providing lighting design guidance for most kinds of roadway and roadway-related applications. The recommendations contained in this document, however, may not reflect specific local factors or situations that are not typical and require special treatment. The contents of this Standard are based upon consensus of roadway lighting experts. It has no legislative authority unless adopted by an authority having jurisdiction. This Recommended Practice is not intended to establish a basis for civil liability.

This Standard is intended to be a single source of reference for roadway lighting; however, additional documents such as electric codes, transportation design guides and other codes and standards are often required design references.

History of the Document

This Recommended Practice is a compilation by IES staff and the Roadway Lighting Committee's Special Task Group of documents authorized by several lighting organizations and authorities. The majority of topics are from the 12 roadway lighting documents of the Illuminating Engineering Society listed in the **Introduction to This Recommended Practice**, along with the Transportation Association of Canada (TAC) *Guide for the Design of Roadway Lighting* and the TAC *Roadway Lighting Efficiency & Power Reduction Guide*.

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Introduction to Roadway Lighting Chapter 1

Driving at night is a necessity in our modern, 24-hour society. As a result, roadway lighting has also become a modern reality. The main purpose for lighting roadways and other transportation related facilities is to provide an enhanced visual environment for people to safely use the road system during hours of darkness. An enhanced visual environment reduces motor vehicle collisions and provides a safer environment for pedestrians, cyclists, and drivers.[1,2,3] In providing some knowledge of what lies ahead on the road, lighting also provides a level of psychological comfort for those using roadways.

1.1 Why Light?

Collision statistics gathered throughout North America show that more than 50% of fatal collisions happen during nighttime hours. Even though an estimated 25% of travel takes place during these hours, the fatality rate is three times higher than during daytime hours. Properly designed roadway lighting aids in improving visibility of roadway features and helps the road user locate objects on the roadway as well as other vehicles, pedestrians, and cyclists. This results in increased safety for all.[2]

There is a consensus of statistics indicating that roadway lighting substantially decreases nighttime collision rates. Most important, the number of fatalities is reduced. Pedestrian fatalities account for approximately one quarter of all roadway related fatalities; hence, lighting of urban areas with large numbers of pedestrians is also important.[4,5]

Lighting of roadways and other transportation facilities may have a number of benefits not directly related to driving. These include:

- **Personal security:** Although there is some controversy over whether lighting improves security, there is no question that individuals feel more secure when walking, cycling or driving in a well-lighted area. Though some studies have shown that adding luminaires or increasing light levels can reduce crime in a given area, the actual long-term benefits and community-wide impacts are unknown.[6] By creating a safe feeling, lighting may draw people into an area, and increased pedestrian circulation will typically improve security. Social and economic factors of a given area, as well as police presence, will also have impacts on personal security. *Note*: For non-right-of-way areas where security is of particular concern, the reader is referred to IES G-1-16, *Security Lighting for People, Property, and Critical Infrastructure.*
- **Economics:** Lighting may draw people into a commercial area by providing increased visibility of businesses and a sense of personal security, and may thereby lead to an increase in commerce. Decorative lighting can be used for the economic revitalization of an area by contributing to a "sense of place" or by supporting a community architectural or urban design theme. *Note*: The benefits listed above may not necessarily apply to residential roads where there is little or no pedestrian activity during the hours of darkness.
- **Aesthetics:** Lighting may draw attention to architecture and other aesthetic features such as streetscapes, monuments, or parks. These features can enhance the nighttime use of facilities and improve the experience of roadway users at adjacent locations.

This Recommended Practice is intended to recommend proper techniques to allow motorists, pedestrians and cyclists within the right of way to benefit from the value of lighting. If designed or installed improperly, the benefits of lighting may be reduced. Improper pole heights may lead to excessive spill light on adjacent properties. Poles placed within the clear zone without breakaway bases may pose safety concerns. Over-lighting may reduce visibility while consuming excessive amounts of energy.

1.2 Human Factors

The human factors associated with lighting, including physical and psychological aspects, are complex. For roadway lighting, some of these include the condition of the driver's eyes, the constantly changing level of eye adaptation, the driver's level of fatigue, and his or her sensitivity to light.

Visual cues are estimated to comprise about 90 percent of a driver's information, including critical