ANSI/IES/NALMCO RP-36-20

Illuminating ENGINEERING SOCIETY

RECOMMENDED PRACTICE: LIGHTING MAINTENANCE

AN AMERICAN NATIONAL STANDARD

Approved American National Standard ANSI NALMCO

www.ies.org

ANSI/IES/NALMCO RP-36-20

RECOMMENDED PRACTICE: LIGHTING MAINTENANCE

AN AMERICAN NATIONAL STANDARD

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

Prepared by:
The IES Maintenance Committee

Approved by the IES Standards Committee November 22, 2019 as a Transaction of the Illuminating Engineering Society.

Approved February 7, 2020 as an American National Standard.

Published by the Illuminating Engineering Society, 120 Wall Street, New York, New York 10005

IES Standards are developed through committee consensus and produced by the IES Office in New York. Careful attention is given to style and accuracy. If any errors are noted in this document, they should be forwarded to Brian Liebel, Director Standards, at standards@ies.org or the above address for verification and correction. The IES welcomes and urges feedback and comments

Printed in the United States of America.

ISBN# 978-0-87995-069-9

DISCLAIMER

IES publications are developed through the consensus standards development process approved by the American National Standards Institute. This process brings together volunteers representing varied viewpoints and interests to achieve consensus on lighting recommendations. While the IES administers the process and establishes policies and procedures to promote fairness in the development of consensus, it makes no guaranty or warranty as to the accuracy or completeness of any information published herein.

The IES disclaims liability for any injury to persons or property or other damages of any nature whatsoever, whether special, indirect, consequential or compensatory, directly or indirectly resulting from the publication, use of, or reliance on this document.

In issuing and making this document available, the IES is not undertaking to render professional or other services for or on behalf of any person or entity. Nor is the IES undertaking to perform any duty owed by any person or entity to someone else. Anyone using this document should rely on his or her own independent judgment or, as appropriate, seek the advice of a competent professional in determining the exercise of reasonable care in any given circumstances.

The IES has no power, nor does it undertake, to police or enforce compliance with the contents of this document. Nor does the IES list, certify, test or inspect products, designs, or installations for compliance with this document. Any certification or statement of compliance with the requirements of this document shall not be attributable to the IES and is solely the responsibility of the certifier or maker of the statement.

AMERICAN NATIONAL STANDARD

Approval of an American National Standard requires verification by ANSI that the requirements for due process, consensus, and other criteria have been met by the standards developer.

Consensus is established when, in the judgment of the ANSI Board of Standards Review, substantial agreement has been reached by directly and materially affected interests. Substantial agreement means much more than a simple majority, but not necessarily unanimity. Consensus requires that all views and objections be considered, and that a concerted effort be made toward their resolution.

The use of American National Standards is completely voluntary; their existence does not in any respect preclude anyone, whether that person has approved the standards or not, from manufacturing, marketing, purchasing, or using products, processes, or procedures not conforming to the standards.

The American National Standards Institute does not develop standards and will in no circumstances give an interpretation to any American National Standard. Moreover, no person shall have the right or authority to issue and interpretation of an American National Standard in the name of the American National Standards Institute. Requests for interpretations should be addressed to the secretariat or sponsor whose name appears on the title page of this standard.

CAUTION NOTICE: This American National Standard may be revised at any time. The procedures of the American National Standards Institute require that action be taken to reaffirm, revise, or withdraw this standard no later than five years from the date of approval. Purchasers of American National Standards may receive current information on all standards by calling or writing the American National Standards Institute.

Prepared by the IES Maintenance Committee

Norma J. Frank, *Chair*

Members

W. C. Boren
R. J. Breske
E. Ennen
K. Mallardi
C. S. Mendelsohn
S. Rahm

Advisory Members

V. H. Frank

Acknowledgements

Special thanks to the interNational Association of Lighting Management Companies (NALMCO) for co-sponsoring the development of this Recommended Practice.

CONTENTS

Foreword

This Foreword is not part of ANSI/IES RP-36-20. It is provided for informational purposes only.

This Recommended Practice (RP) does not provide general lighting information that is included in other IES documents. If the reader does not already have this information, it may be obtained as needed from the following IES Standards:

The Lighting Science Series:

- *ANSI/IES LS-1-20, Lighting Science: Nomenclature and Definitions for Illuminating Engineering*
- *ANSI/IES LS-2-20, Lighting Science: Concepts and Language of Lighting*
- *ANSI/IES LS-3-20, Lighting Science: Physics and Optics of Radiant Power*
- *ANSI/IES LS-4-20, Lighting Science: Measurement of Light – The Science of Photometry*
- *ANSI/IES LS-5-20, Lighting Science: Color*
- *ANSI/IES LS-6-20, Lighting Science: Calculation of Light and Its Effects*
- *ANSI/IES LS-7-20, Lighting Science: Vision – Eye and Brain*
- *ANSI/IES LS-8-20: Lighting Science: Vision – Perceptions and Performance*

The Lighting Practice Series:

- *ANSI/IES LP-1-20, Lighting Practice: Designing Quality Lighting for People and Buildings*
- *ANSI/IES LP-2-20, Lighting Practice: Designing Quality Lighting for People in Outdoor Environments*
- *ANSI/IES LP-3-20, Lighting Practice: Designing and Specifying Daylighting for Buildings*
- *ANSI/IES LP-4-20, Lighting Practice: Electric Light Sources – Properties, Selection, and Specification*
- *ANSI/IES LP-6-20, Lighting Practice: Lighting Control Systems – Properties, Selection, and Specification*
- *ANSI/IES LP-7-20 Lighting Practice: The Lighting Design and Construction Process*
- *ANSI/IES LP-8-20, Lighting Practice: The Commissioning Process Applied to Lighting and Control Systems*
- *ANSI/IES LP-10-20, Lighting Practice: Sustainable Lighting – An Introduction to the Environmental Impacts of Lighting*
- *ANSI/IES LP-11-20, Lighting Practice: Environmental Considerations for Outdoor Lighting*

1.0 Introduction and Scope

1.1 Introduction

All electric lighting systems degrade in performance during their operating life. Light sources produce less and less light the longer they operate, while their spectral output may shift in color. Light output may be absorbed by dirt and dust accumulation on luminaire surfaces. Light distribution may be distorted by dirt and dust and/or degradation of luminaire surfaces. Components fail over time. If left unchecked, ongoing loss of illuminance and disruption to uniformity will continue until the lighting system ceases to function.

Although automatic lighting controls are specified increasingly in commercial buildings as a mandatory energy-saving measure, they should be properly designed, installed and calibrated to save energy. Over time, space layout, user needs and/or occupancy patterns may change, resulting in misalignment between control operation and how the space is used. If users are dissatisfied, they may seek to override the controls, potentially negating energy savings.

To ensure continuing operations, owners take actions to preserve the functionality of their lighting systems, referred as *maintenance*. Well maintained lighting systems function in a predictable manner while offering the potential for capital and operating cost savings. Poorly maintained lighting systems may provide unsatisfactory illuminance, and may suffer from unaddressed outages, non-uniform light distribution, color shift, improperly aimed luminaires, mismatched components, cycling lamps, early component failure, and other problems. This may translate to problems with user satisfaction, productivity, aesthetics, sales, safety and security, and the ability to capture intended energy savings on an ongoing basis.

How a lighting system will be maintained is important information for lighting designers, just as design information is important for maintenance personnel. Since the maintenance method influences the extent of expected light loss, it also relates to the amount of lumen output needed to maintain the required illuminance. In other words, if a well-maintained lighting system will result in a higher maintained illuminance, then fewer lumens are needed to produce the design level, which may translate to fewer and/or lower-wattage luminaires. This will reduce capital and energy costs.

Designers, meanwhile, should design lighting systems that are easy to maintain, specify commissioning criteria or expectations when possible, and ensure that maintenance personnel are properly trained and given a complete system manual upon turnover. Easy-to-maintain lighting systems feature readily accessible, long-life components within designs in which the luminaires are similarly accessible without excessive difficulty or cost. Commissioning ensures that the initial installed system is verified as satisfying owner project requirements. Maintenance personnel should be trained on the proper operation and maintenance of the lighting system, and have all appropriate documentation on hand regarding the finished design and how to maintain it, including owner project requirements, design intent, final drawings, a schedule of installed components and systems, device settings, lighting control sequence of operations, and a recommended maintenance plan.

Robust maintenance requires more attention and resources, and therefore benefits from planning. Planned maintenance involves scheduling operations and maintaining the lighting system with the most time- and cost-efficient use of labor and resources, utilizing techniques such as periodic inspection, group relamping and luminaire cleaning. All components in the lighting system (e.g., controls, power supplies, sensors) are documented so that they are properly maintained. The design itself is documented and understood by maintenance personnel so that operations are undertaken to maintain the original design intent, not just the equipment in the system.

As lighting systems become increasingly complex, properly maintaining them requires more resources, expertise, and competence. Often, it is desirable for the owner to use a lighting management company and trained staff. Such companies are represented within the lighting industry by the interNational Association of Lighting Management Companies (NALMCO). Its members' professionalism, experience, and lighting expertise are recognized by the Association's Certified Lighting Management Consultant (CLMC), Certified Senior Lighting Technician (CSLT), Certified Lighting Controls Professional (CLCP), and Certified Apprentice Lighting Technician (CALT) certifications.

1.2 Scope

This Recommended Practice examines common lighting maintenance procedures and the central components of an effective planned maintenance program. Specifically, it describes:

- Typical lighting system behavior, identifying those light loss factors that can be addressed by maintenance
- Maintenance approaches that can optimize lighting system performance
- Ways in which designers should address maintenance
- Typical maintenance techniques, equipment, and operations
- Proper disposal of spent components
- Troubleshooting system problems

Lighting designers and specifiers can use this Recommended Practice to design lighting systems that will be easy to maintain and will optimize energy efficiency and maintenance based on good maintenance practices and careful product selection. They will also be able to recommend good maintenance practices. Facility owners and managers can use it to develop a maintenance plan and properly maintain their lighting systems to ensure that their investment in light performs in accordance with requirements far into the future. Other electrical and lighting professionals can use the Recommend Practice in the roles they play in recommending, specifying, installing, commissioning, and maintaining lighting systems.